Issued September 1969

SOIL SURVEY

Perry County, Indiana

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service and Forest Service
In cooperation with
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

Major fieldwork for this soil survey was done in the period 1956–63. Soil names and descriptions were approved in 1966. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1966. This survey was made by the Soil Conservation Service and the Forest Service in cooperation with Purdue University Agricultural Experiment Station. The contribution of the Soil Conservation Service was part of the technical assistance furnished to the Perry County Soil and Water Conservation District.

Either enlarged or reduced copies of the printed soil map can be made by commercial photographers, or can be purchased, on individual order, from the Cartographic Division, Soil Conservation Service, USDA, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in judging the suitability of tracts of land for agriculture, industry, or recreation.

Locating Soils

All the soils of Perry County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by a symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The Guide to Mapping Units can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol. It shows the page where each kind of soil is described, and also the page for the capability unit and the woodland group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Woodland," where the soils of the county are grouped in tabular form according to their suitability for trees.

Game managers and sportsmen can find information about soils and wildlife in the section "Wildlife."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Perry County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County," which gives additional information.

Cover: A typical farm in the Deer Creek watershed in Perry County. Haymond soils are on the bottom lands. Zanesville and Wellston soils are on the sloping areas in the foreground, and Gilpin and Muskingum soils occupy the wooded areas in the background.

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

PERRY COUNTY, in the extreme south-central part of Indiana (fig. 1), has an area of 384 square miles, or 245,760 acres. Cannelton, in the southwestern part of the county along the Ohio River, is the county seat.

Much of the county is on uplands and is strongly sloping to very steep. Many of the bottom lands, including those along the Ohio River, are subject to flooding.

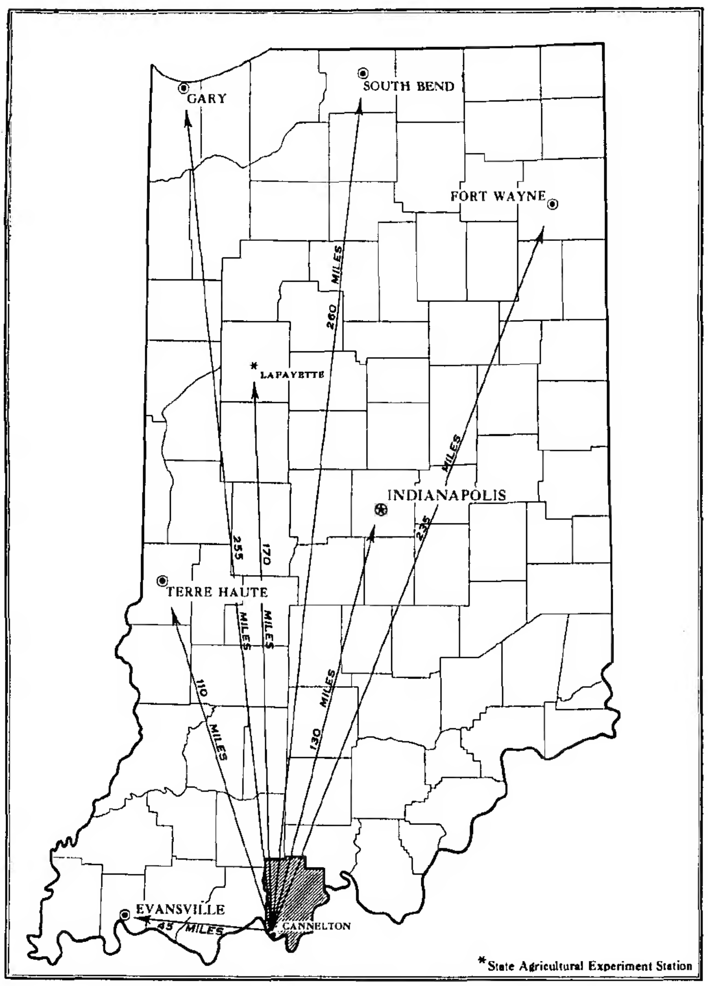

Figure 1.—**Location of Perry County in Indiana.**

Terraces along the Ohio River and its major tributaries are nearly level and gently sloping. In many places steep escarpments separate the terraces from the bottom lands.

Most of the acreage is used for woodland and permanent pasture. A small percentage—mostly on bottom lands, terraces, and broad ridgetops—is used for cultivated crops. Most farms in the county are general farms. Livestock and livestock products are the major sources of farm income.

How This Soil Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Perry County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots of plants.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this publication efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Princeton and Alford, for example, are the names of two soil series. All soils in the United States having the same series name are essentially alike in natural characteristics.

Many soil series contain soils that differ in the texture

of their surface layer. According to such differences in texture, separations called soil types are made. Within a series, all soils having a surface layer of the same texture belong to one soil type. Princeton fine sandy loam and Princeton loam are two soil types in the Princeton series. The difference in texture of their surface layers is apparent from their names.

Some soil types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into phases, primarily on the basis of difference in slope or degree of erosion, because these differences affect management. For example, Alford silt loam, 2 to 6 percent slopes, eroded, is one of several phases of Alford silt loam, a soil type that has a slope range of 2 to 25 percent.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

Some mapping units contain more than one kind of soil in a pattern more open and less intricate than that of a soil complex. Such a mapping unit is called a soil association. A soil association differs from a soil complex in that its component soils could be mapped separately, at ordinary scales such as 4 inches per mile, and would be if practical advantages made the effort worthwhile. A soil association, like a soil complex, is named for the major soils in it, for example, Wellston-Gilpin-Muskingum association, 18 to 25 percent slopes.

Most surveys include areas where the soil material is so rocky, so shallow, or so frequently worked by wind and water that it cannot be classified by soil series. These areas are shown on the map like other mapping units, but they are given descriptive names, such as Gullied land, and are called land types.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for those soils that are suitable for cultivation.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way that it is readily useful to different groups of readers, among them farmers, managers of woodland, engineers, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in soil surveys. On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust them according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under methods of use and management current at the time of this survey.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Perry County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The five associations in this county are described in the following pages. The terms for texture used in the title for each of the associations applies to the texture of the surface layer.

1. Gilpin-Muskingum-Wellston association

Moderately deep and deep, well-drained, medium-textured, gently sloping to very steep soils on uplands

This association consists of gently sloping to very steep soils on uplands. It makes up about 54 percent of the county.

Soils of the Gilpin and Muskingum series, which make up about 70 percent of the association, occupy long, steep slopes and short, very steep breaks below ridgetops. These soils developed in material weathered from acid sandstone, siltstone, and shale. They are underlain by bedrock (fig. 2) at a depth of 20 to 36 inches. Their surface layer is dark-gray and brown silt loam. Gilpin soils have a subsoil of strong-brown cherty silt loam, most of which is less than 20 percent coarse fragments. Muskingum soils have a yellowish-brown subsoil that is 20 to 50 percent coarse fragments.

Soils of the Wellston series, which make up about 29 percent of the association, occupy gently sloping and sloping ridgetops and strongly sloping and steep side slopes in the uplands. Their surface layer is silt loam.

Their subsoil is heavy silt loam, but it contains many coarse fragments in the lower part. These soils developed in silty loess, about 20 to 36 inches thick, overlying material weathered from sandstone, siltstone, and shale. They are underlain by bedrock at a depth of 30 to 60 inches. Their surface layer is brown and yellowish brown. Their subsoil is strong brown and yellowish brown; the lower part of it contains many coarse fragments.

Figure 2.—**Interbedded sandstone, siltstone, and shale underlies the soils of association 1. Bedrock escarpments such as this occur throughout the association.**

The remaining 1 percent of the association consists mainly of soils of the Corydon series. These soils are steep and very steep. They are underlain by bedrock at a depth of 10 to 20 inches.

Most of this association is wooded. Some of the gently sloping and sloping ridgetops and side slopes are used for pasture and cultivated crops. Small grain and meadow are the main crops. Corn and soybeans are also grown, but less extensively. Erosion is a serious hazard if these soils are cultivated.

2. *Zanesville-Tilsit association*

Deep, well drained and moderately well drained, medium-textured, nearly level to strongly sloping soils that have a brittle, slowly permeable or very slowly permeable fragipan in the lower part of the subsoil; on uplands

This association consists of nearly level to strongly sloping soils on uplands. It makes up about 24 percent of the county.

Soils of the Zanesville and Tilsit series make up about 81 percent of the association. These soils developed in silt, 18 to 48 inches thick, over material weathered from sandstone, siltstone, and shale. They have a brittle, slowly permeable or very slowly permeable fragipan at a depth of about 28 inches.

Soils of the Zanesville series are well drained. They have a surface layer of dark-brown silt loam and a subsoil of strong-brown and light yellowish-brown silt loam or silty clay loam. They occur on gently sloping ridgetops and sloping and strongly sloping side slopes below ridgetops.

Soils of the Tilsit series are moderately well drained. They have a surface layer of dark-brown and strong-brown silt loam. Their subsoil is yellowish brown and gray mottled with gray and brown and is mostly silty clay loam. They occur on narrow, nearly level ridgetops and as gently sloping areas along drainageways and on side slopes of broad ridgetops.

The remaining 19 percent of the association is made up of soils of the Alford, Crider, and Johnsburg series. Alford soils are well drained. They occur on gently sloping to moderately steep uplands adjacent to the Ohio River. They developed in thick deposits of silt over sandstone, siltstone, and shale. Crider soils, also, are well drained. They occur on gently sloping to strongly sloping and rolling uplands along the eastern boundary of the county. They developed in silty loess over material weathered from limestone. Johnsburg soils are somewhat poorly drained. They occur as nearly level and gently sloping areas on ridgetops near Apalona and Mt. Pleasant. They developed in silt, 18 to 48 inches thick, over material weathered from sandstone, siltstone, and shale.

Most of this association is used for crops and pasture. Corn, soybeans, small grain, and meadow are the main crops. General livestock farming is the main enterprise. Some small areas are wooded. Erosion and runoff are the main hazards. The soils that have a fragipan have a shallow root zone.

3. *Haymond-Pope-Elkinsville association*

Deep, well-drained, medium-textured, nearly level to sloping soils on flood plains and old stream terraces

This association consists of nearly level to sloping soils on flood plains and old stream terraces. It makes up about 10 percent of the county.

Soils of the Haymond series, which make up about 33 percent of the association, occur as nearly level bottom lands along major tributaries of the Ohio River. These soils have a surface layer of dark-brown silt loam and a subsoil of yellowish-brown silt loam.

Soils of the Pope series, which make up about 26 percent of the association, occur as nearly level, narrow bottom lands near the headwaters of main tributaries of the Ohio River. These soils have a surface layer of dark-brown loam and fine sandy loam over strong-brown sandy loam. They are underlain by channery sandy loam, sand, and gravel at a depth of about 18 inches.

Soils of the Elkinsville series, which make up about 12 percent of the association, occur on nearly level and gently sloping terraces and on sloping terrace breaks adjacent to bottom lands. These soils have a surface layer of dark yellowish-brown silt loam and a subsoil mostly of yellowish-brown silt loam.

The remaining 29 percent of the association is made up mainly of small areas of soils of the Cuba, Pekin, Bartle, Philo, and Stendal series. These soils are well drained to somewhat poorly drained.

Most of this association is used for crops and pasture. Corn, soybeans, wheat, and meadow are the main crops. Areas on bottom lands are subject to flooding by runoff

from adjacent upland soils. Severe damage to wheat and some meadow crops is likely if flooding is prolonged.

4. *Wheeling-Huntington-Weinbach association*

Deep, well-drained to somewhat poorly drained, medium-textured, nearly level to sloping soils on stream terraces and flood plains

This association consists of nearly level to sloping soils on terraces and bottom lands. It makes up about 7 percent of the county.

Soils of the Wheeling series, which make up about 40 percent of the association, occur on terraces above the bottom lands. These soils are well drained. They have a surface layer of dark-brown silt loam and a subsoil that is mostly strong-brown silty clay loam and silt loam.

Soils of the Huntington series, which make up about 18 percent of the association, occur on bottom lands along the Ohio River. These soils are well drained. They have a surface layer of dark-brown and very dark grayish-brown silt loam and a subsoil of dark-brown silt loam and silty clay loam.

Soils of the Weinbach series, which make up about 12 percent of the association, occur on nearly level and gently sloping terraces above the bottom lands of the Ohio River. These soils are somewhat poorly drained. They have a surface layer of dark grayish-brown and brown silt loam and a subsoil that consists mostly of a fragipan of light brownish-gray silt loam and silty clay loam mottled with pale brown and yellowish brown.

The remaining 30 percent of this association consists mainly of soils of the Sciotoville, Princeton, and Ginat series, which occur on terraces above the Ohio River, and of soils of the Woodmere, Lindside, and Newark series, which occur on bottom lands along the Ohio River.

This association is used for crops and pasture. If properly managed, most of it is well suited to intensive row cropping. Corn, soybeans, small grain, and meadow are the main crops. There is little or no limitation on the use of the nearly level, well-drained soils. Erosion and runoff are hazards on the gently sloping and sloping soils, and flooding is a hazard on bottom-land soils. Wetness limits the use of some of the soils on terraces and bottom lands.

5. *Markland-Henshaw-Uniontown association*

Deep, well-drained to somewhat poorly drained, medium-textured, nearly level to steep soils on stream terraces

This association consists of nearly level to steep soils on lacustrine terraces along the margin of the flood plain of the Ohio River and in valleys of its tributaries. It makes up about 5 percent of the county.

Soils of the Markland series, which make up about 44 percent of the association, occur throughout the association on sloping terraces and strongly sloping to steep terrace breaks. They are well drained and moderately well drained. Their surface layer is dark grayish-brown and brown silt loam, and their subsoil is mostly dark-brown silty clay.

Soils of the Henshaw series, which make up about 30 percent of the association, are nearly level and gently sloping. They are somewhat poorly drained. Their surface layer is dark-brown silt loam, and their subsoil is yellowish-brown silty clay loam mottled with gray, brown, and grayish brown.

Soils of the Uniontown series, which make up about 20 percent of the association, are gently sloping and sloping. They are well drained and moderately well drained. Their surface layer is dark grayish-brown and yellowish-brown silt loam, and their subsoil is yellowish-brown silty clay loam.

The remaining 6 percent of the association consists mainly of soils of the McGary and Patton series. McGary soils are somewhat poorly drained, and Patton soils are very poorly drained.

About half of this association is used for cultivated crops and pasture. The rest is either idle or in forest. Corn, soybeans, wheat, and meadow are the main cultivated crops. General livestock farming is the main enterprise. Erosion and runoff are hazards on the gently sloping and steeper soils. Wetness limits the use of the somewhat poorly drained to very poorly drained soils.

Descriptions of the Soils

This section describes the soil series and mapping units of Perry County. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

In the pages that follow, a general description of each soil series is given. Each series description has a detailed description of a profile typical of the series and a brief statement of the range in characteristics of the soils in the series, as mapped in this county. Following the series description, each mapping unit in the series is described individually. For full information on any one mapping unit, it is necessary to read the description of the soil series as well as the description of the mapping unit. Miscellaneous land types, such as Gullied land, are described in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. At the end of the description of each mapping unit are listed the capability unit and the woodland group in which the mapping unit has been placed. The page where each of these groups is described can be found readily by referring to the Guide to Mapping Units.

For more general information about the soils, the reader can refer to the section "General Soil Map," in which the broad patterns of soils are described. Many of the terms used in the soil descriptions and other parts of the report are defined in the Glossary.

Alford Series

The Alford series consists of deep, well-drained, gently sloping to moderately steep soils (fig. 3) that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in silty loess. The native vegetation was a mixed hardwood forest. Alford soils occur on uplands near the Ohio River.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent
Alford silt loam, 2 to 6 percent slopes, eroded	1, 090	0. 4
Alford silt loam, 6 to 12 percent slopes, eroded	444	. 2
Alford silt loam, 6 to 12 percent slopes, severely eroded	791	. 3
Alford silt loam, 12 to 18 percent slopes	283	. 1
Alford silt loam, 12 to 18 percent slopes, severely eroded	1, 656	. 7
Alford silt loam, 18 to 25 percent slopes, severely eroded	1, 131	. 5
Bartle silt loam, 0 to 3 percent slopes	1, 209	. 5
Bruno fine sandy loam	334	. 1
Corydon stony silt loam, 18 to 25 percent slopes	1, 248	. 5
Corydon stony silt loam, 25 to 70 percent slopes	497	. 2
Crider silt loam, 2 to 6 percent slopes, eroded	437	. 2
Crider silt loam, 12 to 18 percent slopes, eroded	267	. 1
Crider silty clay loam, 6 to 12 percent slopes, severely eroded	775	. 3
Crider silty clay loam, 12 to 18 percent slopes, severely eroded	1, 852	. 8
Cuba silt loam	1, 828	. 7
Elkinsville silt loam, 0 to 2 percent slopes	416	. 2
Elkinsville silt loam, 2 to 6 percent slopes, eroded	1, 696	. 7
Elkinsville silt loam, 6 to 12 percent slopes, severely eroded	188	. 1
Gilpin-Wellston-Muskingum association, 25 to 35 percent slopes	47, 050	19. 1
Ginat silt loam	285	. 1
Gullied land	2, 834	1. 2
Haymond silt loam	7, 698	3. 1
Henshaw silt loam, 0 to 2 percent slopes	2, 459	1. 0
Henshaw silt loam, 2 to 6 percent slopes, eroded	1, 246	. 5
Huntington silt loam	3, 107	1. 3
Johnsburg silt loam, 0 to 2 percent slopes	972	. 4
Johnsburg silt loam, 2 to 6 percent slopes, eroded	647	. 3
Lindside silt loam	699	. 3
Markland silt loam, 12 to 18 percent slopes, eroded	374	. 2
Markland silt loam, 18 to 25 percent slopes, eroded	424	. 2
Markland silty clay loam, 6 to 12 percent slopes, severely eroded	266	. 1
Markland silty clay loam, 12 to 18 percent slopes, severely eroded	1, 984	. 8
Markland silty clay loam, 18 to 25 percent slopes, severely eroded	1, 172	. 5
Markland silty clay loam, 25 to 35 percent slopes, severely eroded	1, 246	. 5
McGary silt loam	648	. 3
Muskingum-Gilpin association, 35 to 70 percent slopes	12, 133	4. 9
Newark silt loam	996	. 4
Patton silty clay loam	61	[1]
Pekin silt loam, 0 to 2 percent slopes	672	. 3
Pekin silt loam, 2 to 6 percent slopes, eroded	821	. 3
Philo silt loam	761	. 3
Pope loam, channery subsoil variant	4, 993	2. 0
Princeton fine sandy loam, 2 to 6 percent slopes, eroded	236	0. 1
Princeton loam, 12 to 25 percent slopes, severely eroded	256	. 1
Rahm silt loam	232	. 1
Sciotoville silt loam, 0 to 2 percent slopes	500	. 2
Sciotoville silt loam, 2 to 6 percent slopes, eroded	870	. 4
Stendal silt loam	640	. 3
Strip mines	42	[1]
Terrace escarpments	669	. 3
Tilsit silt loam, 0 to 2 percent slopes	825	. 3
Tilsit silt loam, 2 to 6 percent slopes, eroded	3, 035	1. 2
Uniontown silt loam, 2 to 6 percent slopes, eroded	1, 120	. 5
Uniontown silt loam, 6 to 12 percent slopes, severely eroded	1, 411	. 6
Wakeland silt loam	3, 692	1. 5
Weinbach silt loam, 0 to 2 percent slopes	1, 494	. 6
Weinbach silt loam, 2 to 4 percent slopes, eroded	529	. 2
Wellston silt loam, 2 to 6 percent slopes, eroded	412	. 2
Wellston silt loam, 2 to 6 percent slopes, severely eroded	228	. 1
Wellston silt loam, 6 to 12 percent slopes, eroded	1, 526	. 6
Wellston silt loam, 6 to 12 percent slopes, severely eroded	2, 458	1. 0
Wellston silt loam, 12 to 18 percent slopes	3, 975	1. 6
Wellston silt loam, 12 to 18 percent slopes, severely eroded	18, 307	7. 5
Wellston silt loam, 18 to 25 percent slopes	1, 093	. 4
Wellston silt loam, 18 to 25 percent slopes, severely eroded	9, 733	4. 0
Wellston-Gilpin-Muskingum association, 18 to 25 percent slopes	30, 915	12. 6
Wheeling silt loam, 0 to 2 percent slopes	2, 331	. 9
Wheeling silt loam, 2 to 6 percent slopes, eroded	2, 370	1. 0
Wheeling silt loam, 6 to 12 percent slopes, eroded	1, 004	. 4
Wheeling silt loam, 6 to 12 percent slopes, severely eroded	533	. 2
Woodmere silt loam	846	. 3
Zanesville silt loam, 2 to 6 percent slopes, eroded	12, 489	5. 1
Zanesville silt loam, 2 to 6 percent slopes, severely eroded	847	. 3
Zanesville silt loam, 6 to 12 percent slopes, eroded	6, 058	2. 5
Zanesville silt loam, 6 to 12 percent slopes, severely eroded	12, 900	5. 2
Zanesville silt loam, 12 to 18 percent slopes	807	. 3
Zanesville silt loam, 12 to 18 percent slopes, severely eroded	8, 703	3. 5
Urban	2, 884	1. 2
Water	100	[1]
Total	245, 760	100. 0

[1] Less than 0.05 percent.

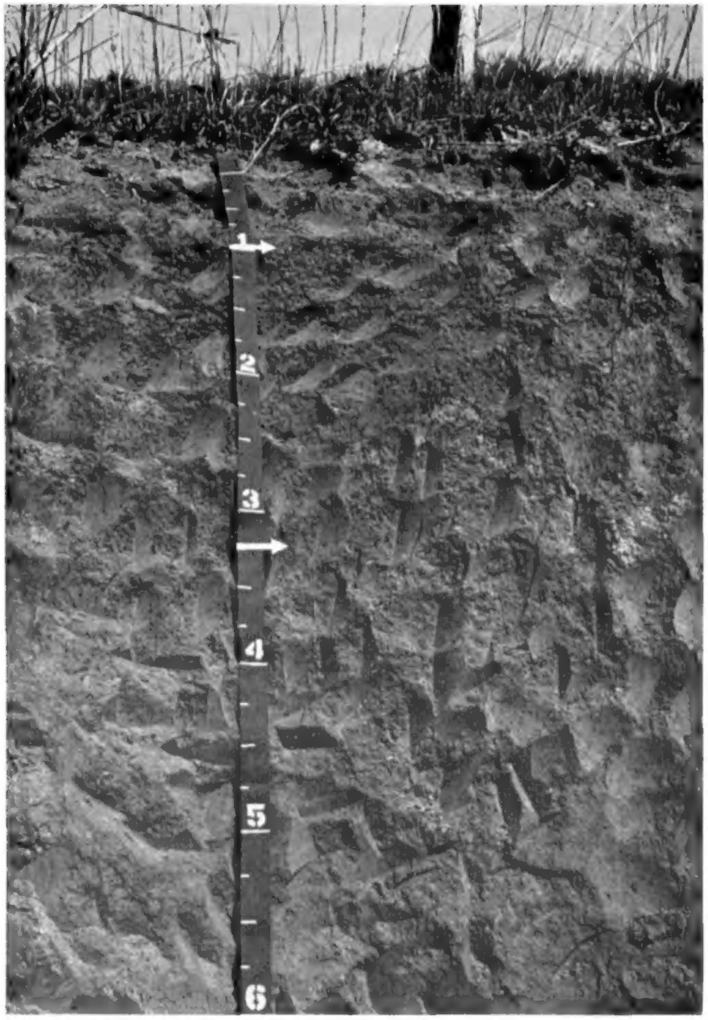

Figure 3.—**Typical profile of Alford silt loam.**

The surface layer, about 11 inches thick, consists of friable silt loam. The uppermost 7 inches is brown or dark brown, and the lower part is dark yellowish brown. The subsoil, about 78 inches thick, consists of silt loam to silty clay loam that has subangular blocky structure. The uppermost 15 inches is yellowish-red, very strongly acid and strongly acid, friable silt loam. The middle part consists of yellowish-red, strongly acid, firm silty clay loam 14 inches thick. The lower part consists of yellowish-red and strong-brown, strongly acid, friable silt loam 49 inches thick. The underlying material consists of yellowish-red, slightly acid, friable, massive silt loam.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium or high. The available moisture capacity is high, and permeability is moderate. Surface runoff is medium or rapid. The surface layer is acid unless it is limed.

A typical profile of Alford silt loam, in a pasture at a point 1,030 feet east and 3,130 feet south of the NW. corner of sec. 18, T. 6 S., R. 3 W.

Ap—0 to 7 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—7 to 11 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, granular structure or weak, fine and medium, subangular blocky; friable when moist; medium acid; clear, smooth boundary.

B1t—11 to 15 inches, yellowish-red (5YR 5/8) silt loam; moderate, medium, subangular blocky structure; friable when moist; very pale brown (10YR 7/4) root fills and voids; yellowish-red (5YR 4/8) clay films on some ped faces; very strongly acid; clear, smooth boundary.

B21t—15 to 26 inches, yellowish-red (5YR 5/8) heavy silt loam; moderate, medium, subangular blocky structure; friable when moist; yellowish-red (5YR 4/8) clay films on most ped faces; many fine capillary pores; strongly acid; clear, wavy boundary.

B22t—26 to 40 inches, yellowish-red (5YR 5/6) light silty clay loam; strong, medium, subangular blocky structure; firm when moist; yellowish-red (5YR 5/8) clay films on all ped faces; yellow (10YR 7/6) to white (10YR 8/2) silt films in cracks and old root zones; many fine capillary pores; strongly acid; clear, smooth boundary.

B23t—40 to 50 inches, yellowish-red (5YR 4/8) silt loam; moderate, medium, subangular blocky structure; friable when moist; strong-brown (7.5YR 5/8) clay films on many ped faces; very pale brown (10YR 7/3) silt coatings in some cracks and old root zones; many fine pores; strongly acid; clear, wavy boundary.

B3t—50 to 89 inches, strong-brown (7.5YR 5/6) silt loam; weak, medium, subangular blocky structure to massive; friable when moist; very pale brown (10YR 7/3 to 7/4) clay films on some ped faces; strongly acid; gradual, wavy boundary.

C—89 to 124 inches, yellowish-red (5YR 5/6) silt loam; massive; friable when moist; white (10YR 8/1) silt coatings along old root zones and cracks; slightly acid.

The B horizon ranges from silt loam to silty clay loam in texture and from yellowish red to yellowish brown in color. The loess ranges from 6 to 12 feet in thickness. It overlies sandstone, siltstone, or shale.

Alford silt loam, 2 to 6 percent slopes, eroded (AfB2).—This soil occurs on narrow ridgetops and along shallow drainageways. It has lost from 4 to 6 inches of the original surface layer through erosion. Included in mapping were small areas of slightly eroded soils, a few small areas of moderately well drained soils, and a few areas where the slope is more than 6 percent.

If properly managed, this soil is well suited to all the crops commonly grown in the county. Corn, soybeans, small grain, meadow, and pasture are the main crops. Orchard crops are also suitable. All of these crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IIe–3; woodland group 1)

Alford silt loam, 6 to 12 percent slopes, eroded (AfC2).—This soil occurs on long, narrow ridges and short breaks adjacent to ridgetops. It has lost from 4 to 6 inches of the original surface layer through erosion. Included in mapping were small areas of slightly eroded soils and a few areas where the slope is more than 12 percent.

If properly managed, this soil is suited to all the crops commonly grown in the county. Corn, soybeans, small grain, meadow, and pasture are the main crops. Orchard crops are also suitable. All of these crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IIIe–3; woodland group 1)

Alford silt loam, 6 to 12 percent slopes, severely eroded (AfC3).—This soil occurs on long slopes between

ridgetops and moderately steep side slopes. It has lost 6 inches or more of the original surface layer through erosion. In many places the yellowish-red subsoil is exposed. Small gullies are numerous. Included in mapping were small areas of slightly to moderately eroded soils and a few areas where the slope is gentle to strong.

This soil is suited to small grain, orchard crops, meadow, and pasture. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IVe-3; woodland group 1)

Alford silt loam, 12 to 18 percent slopes (AfD).—This soil occurs on short slopes near the heads of drainageways and immediately below narrow ridgetops. Included in mapping were a few small areas of moderately steep and steep soils.

This soil is suited to small grain, meadow, orchard crops, and pasture. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IVe-3; woodland group 1)

Alford silt loam, 12 to 18 percent slopes, severely eroded (AfD3).—This soil occurs on short slopes immediately below ridgetops and adjacent to drainageways. It has lost 6 inches or more of the original surface layer through erosion. In most places the yellowish-red subsoil is exposed. Small, narrow gullies are numerous. Included in mapping were a few small areas of slightly and moderately eroded soils and a few of sloping and moderately steep soils.

This soil is suited to orchard crops and permanent pasture. Pasture crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit VIe-1; woodland group 1)

Alford silt loam, 18 to 25 percent slopes, severely eroded (AfE3).—This soil occurs on side slopes immediately below ridges, along drainageways, and on short breaks along major streams near the Ohio River. It has lost 6 inches or more of the original surface layer through erosion. Many small, shallow gullies and a few large, deep ones have formed. In most places the yellowish-red subsoil is exposed. Included in mapping were a few small areas of Gullied land.

This soil is suited to permanent pasture. Pasture crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit VIe-1; woodland group 2)

Bartle Series

The Bartle series consists of deep, somewhat poorly drained, nearly level and gently sloping soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. The native vegetation was a hardwood forest. Bartle soils occur on alluvial fans along major tributaries of the Ohio River.

The surface layer, about 18 inches thick, consists of friable silt loam. The uppermost 8 inches is grayish brown in color. The lower part is pale brown and has many yellowish-brown and light-gray mottles. The subsoil, about 42 inches thick, is gray in color and has strong-brown mottles. The uppermost 14 inches consists of strongly acid, friable silt loam that has subangular blocky structure. The lower part consists of a very strongly acid fragipan of firm silt loam and silty clay loam that has prismatic structure. The underlying material is gray, very strongly acid, firm, massive silty clay loam that has strong-brown mottles.

The organic-matter content is low, and the supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Surface runoff is slow or medium. The plow layer is strongly acid unless it is limed.

A typical profile of Bartle silt loam, in a cultivated field at a point 100 feet east and 400 feet north of the SW. corner of sec. 26, T. 3 S., R. 3 W.

Ap—0 to 8 inches, grayish-brown (10YR 5/2) silt loam; weak, fine, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—8 to 18 inches, pale-brown (10YR 6/3) silt loam; many, fine, distinct, yellowish-brown (10YR 5/8) and light-gray (10YR 7/2) mottles; weak, thick, platy structure; friable when moist; neutral; clear, smooth boundary.

B2t—18 to 32 inches, gray (10YR 6/1) heavy silt loam; many, fine, distinct, strong-brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; friable when moist; strongly acid; clear, smooth boundary.

Bx1—32 to 50 inches, light-gray (10YR 7/2) heavy silt loam; common, medium, distinct, strong-brown (7.5YR 5/8) mottles; weak, coarse, prismatic structure; massive inside of prisms; firm when moist; weakly developed fragipan; numerous soft concretions of manganese and iron; some prisms have thin clay films, and others have thin silt films; very strongly acid; clear, smooth boundary.

Bx2—50 to 60 inches, gray (10YR 6/1) light silty clay loam; many, coarse, distinct, strong-brown (7.5YR 5/8) mottles; weak, coarse, prismatic structure; massive inside of prisms; firm when moist; weakly developed fragipan; many hard concretions, as much as ½ inch in diameter, of manganese and iron; some prisms have thin clay films, and others have thin silt films; very strongly acid; gradual, smooth boundary.

C1—60 to 74 inches, gray (10YR 6/1) light silty clay loam; many, coarse, prominent, strong-brown (7.5YR 5/8) mottles; massive; firm when moist; many soft concretions of manganese and iron; very strongly acid; clear, smooth boundary.

C2—74 to 82 inches +, gray (10YR 6/1) silty clay loam; many, coarse, prominent, strong-brown (7.5YR 5/8) mottles; massive; firm when moist; many soft concretions of manganese and iron; very strongly acid; underlying strata consist of layers of silt loam, silty clay loam, and less prominent layers of fine sandy loam.

The Ap horizon ranges from grayish brown to dark gray in color. The B2 horizon and the upper part of the Bx horizon range from silt loam to silty clay loam in texture. The depth to the fragipan is as little as 18 inches in some places. The depth to the C horizon ranges from 40 to 65 inches. The texture of the C horizon is silty clay loam that is stratified in places with silt loam, fine sand, and clay.

Bartle silt loam, 0 to 3 percent slopes (BoA).—This soil occurs as areas 3 to 20 acres in size. In wooded areas the uppermost 2 or 3 inches is dark gray. Included in mapping were short, moderate to moderately steep slopes that separate this soil from soils on bottom lands. Also included were a few small areas of poorly drained soils.

If drained, this soil is suited to most crops common in the county. The main crops are corn, soybeans, small grain, meadow, and pasture. These crops respond well to lime and fertilizer. Wetness is the main limitation. The fragipan restricts the penetration of roots and water. (Capability unit IIw-2; woodland group 5)

Bruno Series

The Bruno series consists of deep, well-drained, nearly level soils that have a moderately coarse textured surface layer and moderately coarse textured and coarse textured underlying material. These soils developed in recent mixed alluvium. The native vegetation was a mixed hardwood forest. Bruno soils occur on bottom lands along the Ohio River.

The surface layer, about 9 inches thick, consists of dark grayish-brown, friable fine sandy loam. The underlying material extends to a depth of more than 50 inches. The uppermost 9 inches consists of dark grayish-brown, friable fine sandy loam that has platy and granular structure. Below this is 14 inches of dark-brown, loose, single-grain loamy fine sand that contains thin lenses of loam or silt loam. The lower part is dark-brown, friable material stratified with loam, fine sandy loam, silt, and fine sand.

The organic-matter content is low, and the supplies of available phosphorus and potassium are medium. The available moisture capacity is medium, and permeability is moderately rapid to rapid. Surface runoff is slow.

A typical profile of Bruno fine sandy loam, in a cultivated field at a point 3,400 feet west and 2,100 feet south of the NE. corner of sec. 5, T. 8 S., R. 2 W.

Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

C1—9 to 18 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, thick, platy structure breaking to weak, fine, granular; friable when moist; neutral; clear, smooth boundary.

C2—18 to 32 inches, dark-brown (10YR 4/3) loamy fine sand; single grain; loose when moist; thin lenses of silt loam or loam, ¼ inch thick, 4 to 6 inches apart; neutral; clear, smooth boundary.

C3—32 to 50 inches +, dark-brown (10YR 4/3) stratified loam and fine sandy loam that contains lenses of silt and fine sand; massive; friable when moist; neutral.

Figure 4.—Limestone quarry near Derby. Soils of the Corydon series developed in material weathered from limestone.

The Ap horizon ranges from dark grayish brown to dark yellowish brown in color. The C1 and C2 horizons range from fine sandy loam to fine sand in texture. The depth to the C3 horizon ranges from 24 to 36 inches.

Bruno fine sandy loam (0 to 2 percent slopes) (Br).—This soil is subject to flooding late in winter and early in spring. Floodwaters frequently deposit soil material carried from upland areas. Included in mapping were small, narrow tracts of loamy fine sand more than 36 inches deep.

This soil has medium available moisture capacity. Permeability is moderately rapid to rapid. Low rainfall, or unevenly distributed rainfall during the growing season, often results in serious crop damage.

This soil is suited to permanent pasture and to crops that can be planted late in spring, after the flood hazard is past. Corn and soybeans are the main crops. These crops respond well to fertilizer. Alfalfa and small grain are subject to severe damage if flooding is prolonged. Droughtiness and the hazard of flooding late in winter and early in spring are limitations. (Capability unit IIs-8; woodland group 8-A)

Corydon Series

The Corydon series consists of shallow, well-drained, moderately steep to very steep, stony soils that have a medium-textured surface layer and a fine-textured subsoil. These soils developed in material weathered from limestone. They are underlain at a depth of 10 to 20 inches by limestone bedrock (fig. 4). The native vegetation was a mixed hardwood forest. Corydon soils occur on uplands.

The surface layer, about 6 inches thick, consists of friable stony silt loam and stony silty clay loam. The uppermost 1 inch is very dark brown, and the lower part is dark brown. The subsoil, about 8 inches thick, consists of very firm stony silty clay or clay that has blocky structure. The underlying material consists of gray dolomitic limestone that has subsoil material in a few cracks to a depth of about 24 inches.

The natural fertility is low, and the organic-matter content is low. The available moisture capacity is low, and permeability is moderately slow. Surface runoff is rapid or very rapid.

A typical profile of Corydon stony silt loam, in a wooded area at a point 2,000 feet east and 2,400 feet north of the SW. corner of sec. 1, T. 5 S., R. 1 W.

O1—¾ inch to ¼ inch, undecomposed leaf litter.

O2—¼ inch to 0, black (10YR 2/1) organic material mixed with a little mineral soil.

A1—0 to 1 inch, very dark brown (10YR 2/2) stony silt loam; moderate, fine, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A3—1 to 6 inches, dark-brown (10YR 3/3) stony light silty clay loam; moderate, medium, granular structure; friable when moist; neutral; clear, smooth boundary.

IIB2t—6 to 14 inches, dark-brown (7.5YR 4/4) stony silty clay to clay; moderate, fine, angular blocky structure; very firm when moist; discontinuous, dark reddish-brown (5YR 3/4) clay films; neutral; abrupt, irregular boundary; in places this material fills cracks in the limestone to a depth of about 24 inches.

IIR—14 inches +, relatively chert-free, gray dolomitic limestone.

The A horizon ranges from 4 to 7 inches in thickness. In places the hue is 7.5YR. Reaction ranges from medium acid to neutral. The B horizon ranges from dark brown to yellowish red in color and from silty clay loam to clay in texture. Reaction ranges from slightly acid to mildly alkaline. The solum ranges from 10 to 20 inches in thickness. Gravel-size limestone fragments occur throughout the profile and make up as much as 15 percent of the volume.

Corydon stony silt loam, 18 to 25 percent slopes (CoE).—Limestone crops out throughout these areas. Included in mapping were a few small tracts of colluvial soils that are more than 3 feet deep and a few areas of moderately eroded soils.

This soil is not suited to cultivated crops, but it can be used for trees and grass. Runoff and erosion are the main hazards. Shallowness, slope, and stoniness also affect use and management. (Capability unit VIIe-2; woodland group 7)

Corydon stony silt loam, 25 to 70 percent slopes (CoG).—This soil has short slopes and many limestone outcrops. Included in mapping were a few small tracts of colluvial soils that are more than 3 feet deep and a few areas of moderately eroded soils.

This soil is suited to trees and grass. Runoff and erosion are the main hazards. Shallowness, slope, and stoniness also affect use and management. (Capability unit VIIe-2; woodland group 7)

Crider Series

The Crider series consists of deep, well-drained, gently sloping to strongly sloping soils that have a medium-textured and moderately fine textured surface layer and a moderately fine textured and fine textured subsoil. These soils developed in material weathered from high-grade limestone capped with a thin mantle of loess. The native vegetation was a mixed hardwood forest. Crider soils occur on uplands.

The surface layer, about 9 inches thick, consists of dark-brown, friable silt loam. The subsoil, about 34 inches thick, has blocky structure. The uppermost 11 inches consists of reddish-brown and yellowish-red, friable and firm heavy silt loam and silty clay loam. This part is strongly acid and very strongly acid. The lower part consists of red, firm and very firm, very strongly acid silty clay loam and silty clay or clay. The underlying material is high-grade limestone bedrock.

Crider soils are naturally very productive. They have a high available moisture capacity and are moderately permeable. Surface runoff is medium or rapid. The plow layer is strongly acid unless it is limed.

A typical profile of Crider silt loam, in a cultivated field at a point 1,200 feet west and 1,900 feet north of the SE. corner of sec. 12, T. 6 S., R. 2 W.

Ap—0 to 9 inches, dark-brown (10YR 4/3) silt loam; moderate, medium to fine, granular structure; friable when moist; neutral; abrupt, smooth boundary.

B1t—9 to 13 inches, reddish-brown (5YR 4/4) heavy silt loam; moderate, fine, subangular blocky structure; friable when moist; strongly acid; clear, smooth boundary.

B21t—13 to 20 inches, yellowish-red (5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; firm when moist; very strongly acid; clear, smooth boundary.

IIB22t—20 to 32 inches, red (2.5YR 4/6) silty clay loam; moderate, medium, angular and subangular blocky structure; firm when moist; thin, red (2.5YR 4/8) clay films on all ped faces; numerous black (10YR 2/1) concretions of manganese and iron; very strongly acid; clear, smooth boundary.

IIB23t—32 to 43 inches, red (2.5YR 4/6) silty clay to clay; strong, medium, angular blocky structure; very firm when moist; small, red (2.5YR 4/8) concretions of manganese and iron; very strongly acid; clear, smooth boundary.

IIC—43 to 44 inches, brown (10YR 5/3) clay; massive; plastic when wet; calcareous; abrupt, wavy boundary.

IIR—44 inches +, limestone; high calcium carbonate equivalent and little or no chert.

The Ap horizon ranges from 7.5YR to 10YR in hue. In places the B1 horizon is lacking. The B21t horizon ranges from yellowish red to strong brown in color, and the B22t horizon ranges from red to reddish brown. The B horizon ranges from medium acid to very strongly acid in reaction. The loess mantle ranges from 5 to 22 inches in thickness. In places a few chert fragments occur below a depth of 3 feet. The depth to bedrock ranges from 42 to 72 inches or more.

Crider silt loam, 2 to 6 percent slopes, eroded (CrB2).—This soil occurs on narrow ridges and benches in the uplands. It has lost from 3 to 5 inches of the original surface layer through erosion. In most places part of the reddish subsoil is mixed into the plow layer. Included in mapping were a few small areas of severely eroded or slightly eroded soils. There are a few sinkholes in some areas.

This soil is suited to corn, small grain, meadow, orchard crops, and pasture. It is especially well suited to alfalfa. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IIe-3; woodland group 1)

Crider silt loam, 12 to 18 percent slopes, eroded (CrD2).—This soil occurs in the uplands. It has lost from 3 to 5 inches of the original surface layer through erosion. In most places some of the reddish subsoil is mixed into the plow layer. Included in mapping were small areas of severely eroded soils that are underlain by bedrock at a depth of less than 36 inches. Also included were a few small tracts of slightly eroded soils, mainly in wooded areas.

This soil is suited to small grain, meadow, orchard crops, and pasture. It is well suited to alfalfa. All of these crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IVe-3; woodland group 1)

Crider silty clay loam, 6 to 12 percent slopes, severely eroded (CsC3).—This soil occurs on short, irregular slopes in the uplands. It has lost from 5 to 8 inches of the original surface layer through erosion. In most places the reddish subsoil is exposed. There are small gullies throughout these areas and a few sinkholes. Included in mapping were tracts of moderately eroded, gently sloping and sloping soils.

This soil is suited to small grain, meadow, orchard crops, and pasture. It is well suited to alfalfa. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IVe-3; woodland group 1)

Crider silty clay loam, 12 to 18 percent slopes, severely eroded (CsD3).—This soil occurs on short slopes in

the uplands. It has lost from 5 to 8 inches of the original surface layer through erosion. In most places the reddish subsoil is exposed. There are many deep gullies in which the limestone bedrock is exposed. Included in mapping were tracts where the soil is less than 3 feet deep over bedrock.

This soil is suited to orchard crops and permanent pasture. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit VIe-1; woodland group 1)

Cuba Series

The Cuba series consists of deep, well-drained, nearly level soils that have a medium-textured surface layer and subsoil. These soils formed in alluvium. The native vegetation was a mixed hardwood forest. Cuba soils occur on long, narrow bottom lands along tributaries of the Anderson and Ohio Rivers.

The surface layer, about 6 inches thick, consists of brown or dark-brown, friable silt loam. The subsoil, about 26 inches thick, consists of brown or dark-brown, friable, medium acid silt loam. The uppermost 4 inches has platy structure, and the lower part has granular structure. The underlying material consists of yellowish-brown, friable, strongly acid silt loam and loam that is mostly massive.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow to ponded.

A typical profile of Cuba silt loam, in an abandoned field at a point 1,300 feet east and 700 feet north of the SW. corner of sec. 28, T. 3 S., R. 2 W.

Ap—0 to 6 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable when moist; medium acid; abrupt, smooth boundary.

B21—6 to 10 inches, brown to dark-brown (10YR 4/3) silt loam; weak, medium, platy structure; friable when moist; medium acid; clear, wavy boundary.

B22—10 to 32 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable when moist; medium acid; diffuse, wavy boundary.

C1—32 to 44 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, granular structure to massive; friable when moist; strongly acid; clear, wavy boundary.

C2—44 to 59 inches +, yellowish-brown (10YR 5/8) loam; massive; friable when moist; strongly acid.

The Ap horizon ranges from dark grayish brown to brown in color. The B horizon ranges from dark brown to yellowish brown in color. The reaction ranges from medium acid to very strongly acid. The C horizon generally ranges from medium acid to very strongly acid in reaction, but in places it is neutral below a depth of 50 inches. In places there are a few faint mottles below a depth of 30 inches. In a few areas the C horizon is stratified with thin lenses of sandy material below a depth of 30 inches.

Cuba silt loam (0 to 2 percent slopes) (Cu).—Included with this soil in mapping were a few short, gentle slopes along sloughs and streambanks. Also included were small tracts of moderately well drained soils.

This soil is well suited to corn, soybeans, meadow, and pasture. These crops respond well to lime and fertilizer. Flooding between December and June is the main hazard. Small grain and alfalfa are subject to severe damage if flooding is prolonged. (Capability unit I-2; woodland group 8-A)

Elkinsville Series

The Elkinsville series consists of deep, well-drained, nearly level to sloping soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in old mixed alluvium. The native vegetation was a mixed hardwood forest. Elkinsville soils occur on terraces along major tributaries of the Ohio River.

The surface layer, about 15 inches thick, consists of dark yellowish-brown, friable silt loam. The uppermost 8 inches is neutral, and the lower part is medium acid. The subsoil, about 35 inches thick, consists of yellowish-brown, mostly friable, very strongly acid silt loam and loam that has blocky structure. Very pale brown mottles occur in the lower 10 inches. The underlying material consists of yellowish-brown, friable, very strongly acid, massive loam that has many mottles of very pale brown.

The organic-matter content is low. The supplies of available phosphorus and potassium are medium. The available moisture capacity is high, and permeability is moderate. The plow layer is strongly acid unless it is limed. Surface runoff is slow or medium.

A typical profile of Elkinsville silt loam, in a cultivated field at a point 2,600 feet east and 2,700 feet north of the SW. corner of sec. 27, T. 4 S., R. 3 W.

Ap—0 to 8 inches, dark yellowish-brown (10YR 3/4) (crushed) to dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—8 to 15 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, granular structure; friable when moist; medium acid; clear, smooth boundary.

B21t—15 to 28 inches, yellowish-brown (10YR 5/6) heavy silt loam; moderate, medium, subangular blocky structure; firm when moist; dark reddish-brown (5YR 3/4) clay films on most ped faces; very strongly acid; gradual, smooth boundary.

B22t—28 to 40 inches, yellowish-brown (10YR 5/8) light silt loam; moderate, medium, subangular blocky structure; friable when moist; yellowish-red (5YR 4/8), thin clay films on some ped faces; very strongly acid; gradual, smooth boundary.

IIB3t—40 to 50 inches, yellowish-brown (10YR 5/6) loam; few, fine, faint, very pale brown (10YR 7/4) mottles; weak, coarse, subangular blocky structure; friable when moist; few yellowish-red (5YR 4/8), thin clay films on some ped faces; few pockets of fine sandy loam; very strongly acid; diffuse, smooth boundary.

IIC—50 to 60 inches +, yellowish-brown (10YR 5/4) loam; many, coarse, distinct, very pale brown (10YR 7/4) mottles; massive; friable when moist; very strongly acid.

The A horizon ranges from grayish brown to dark yellowish brown in color. The B horizon ranges from dark yellowish brown to yellowish brown in color and from loam to sandy clay loam in texture. Reaction ranges from strongly acid to extremely acid in the B horizon and from medium acid to very strongly acid in the C horizon. The texture of the C horizon ranges from loam to silt loam or silty clay loam that is stratified with lenses of loam, sandy loam, fine sand, and clay. In places the lower parts of the B and C horizons are free of mottles. The depth to the C horizon ranges from 30 inches to more than 60 inches.

Elkinsville silt loam, 0 to 2 percent slopes (EkA).—Included with this soil in mapping were a few small gently sloping areas. Also included were small tracts of moderately well drained soils.

This soil is well suited to corn, soybeans, small grain, meadow, and pasture. These crops respond well to lime and fertilizer. There are no major hazards or limitations. (Capability unit I–1; woodland group 1)

Elkinsville silt loam, 2 to 6 percent slopes, eroded (EkB2).—This soil occurs on short slopes adjacent to drainageways and bottom lands. It has lost from 4 to 9 inches of the original surface layer through erosion. Included in mapping were small areas of slightly eroded and severely eroded soils. Also included were a few tracts that are nearly level.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IIe–3; woodland group 1)

Elkinsville silt loam, 6 to 12 percent slopes, severely eroded (EkC3).—This soil occurs on short breaks along drainageways and bottom lands. It has lost from 9 to 15 inches of the original surface layer through erosion. A few small gullies have formed.

This soil is suited to small grain, meadow, and pasture. These crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IVe–3; woodland group 1)

Gilpin Series

The Gilpin series consists of moderately deep, well-drained, moderately steep to very steep soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in material weathered from sandstone, siltstone, and shale. Bedrock is at a depth of 20 to 36 inches. The native vegetation was a mixed hardwood forest. Gilpin soils occur on uplands.

The surface layer, about 9 inches thick, consists of friable gritty silt loam. The uppermost 3 inches is dark gray and medium acid, and the lower part is brown and very strongly acid. A few channery fragments occur in the lower part. The subsoil, about 21 inches thick, consists of yellowish-brown and strong-brown, friable, very strongly acid gritty silt loam that has blocky structure. A few channery fragments occur in the upper part, and many in the lower part. The underlying material consists of shale and sandstone bedrock.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is low, and permeability is moderate. Surface runoff is medium to very rapid.

A typical profile of Gilpin silt loam, in a wooded area at a point 1,300 feet east and 2,000 feet north of the SW. corner of sec. 2, T. 7 S., R. 3 W.

O1—1 inch to ½ inch, relatively undecomposed leaf litter.

O2—½ inch to 0, decomposed leaf litter.

A1—0 to 3 inches, dark-gray (10YR 4/1) gritty silt loam; moderate, fine, granular structure; friable when moist; medium acid; abrupt, smooth boundary.

A2—3 to 9 inches, brown (10YR 5/3) gritty silt loam; moderate, medium, granular structure; friable when moist; few channery fragments; very strongly acid; clear, wavy boundary.

B1—9 to 15 inches, yellowish-brown (10YR 5/6) gritty silt loam; moderate, medium, subangular blocky structure; friable when moist; few channery fragments; very strongly acid; clear, wavy boundary.

B2t—15 to 26 inches, strong-brown (7.5YR 5/6) gritty heavy silt loam; moderate, medium, subangular blocky structure; firm when moist; thin, dark-brown (7.5YR 4/4) clay films on many ped faces and in pores and on rock faces; few channery fragments; very strongly acid; clear, wavy boundary.

B3t—26 to 30 inches, yellowish-brown (10YR 5/6) channery gritty silt loam (skeletal, about 60 percent rock fragments); weak, medium, subangular blocky structure; friable when moist; few, thin, dark-brown (7.5YR 4/4) clay films on ped faces and on rock faces; very strongly acid; abrupt, irregular boundary.

R—30 inches +, consolidated shale and fine-grained sandstone; some silt loam soil material in cracks to a depth of 3 to 5 feet.

The A1 horizon ranges from very dark grayish brown to dark gray in color and from 1 to 3 inches in thickness. In places channery fragments make up 15 to 50 percent of the surface layer. The A2 horizon ranges from brown to light yellowish brown in color and from 3 to 7 inches in thickness. A mantle of silty loess, less than 20 inches thick, covers the surface on some of the north-facing slopes. The B2t horizon ranges from silt loam to silty clay loam in texture and from 9 to 18 inches in thickness. In places there are few to many stones on the surface. In some areas the underlying bedrock is thick-bedded sandstone in which there are numerous cracks filled with silty and sandy material to a depth of 3 to 5 feet.

Gilpin-Wellston-Muskingum association, 25 to 35 percent slopes (GmF).—This association occurs mainly on long, steep slopes in the uplands. Most of the areas are between 40 acres and 100 acres in size, but some are larger.

Gilpin silt loam, a moderately deep soil, makes up about 45 percent of the association. It has a slope range of 25 to 30 percent.

Wellston silt loam, a deep and moderately deep soil, makes up about 25 percent of the association. It developed in loess, 20 to 36 inches thick, over material weathered from sandstone, siltstone, and shale. The north-facing slopes range from 25 to 35 percent, the others from 25 to 30 percent.

Muskingum channery silt loam, stony phase, which is moderately deep over bedrock, makes up about 20 percent of the association. About 20 to 40 percent of the subsoil is made up of channery fragments. The slope range is 30 to 35 percent.

Inclusions of other soils make up the remaining 10 percent of the association. Small tracts of Corydon stony silt loam occur in areas of this association in the southeastern and eastern parts of the county. Small areas of strongly acid soils, less than a foot deep over clayey shale, are also included. These shallow soils occur as rims around the base of slopes; in the eastern part of the county, they extend about a quarter of the way up the slopes. Also included are a few small areas of channery soils that are less than 20 inches deep over bedrock. Other inclusions are small, narrow areas of deep, colluvial soils at the base of slopes. These colluvial soils contain large amounts of channery fragments and stones. In addition, areas are included where the slope is less than 25 percent or more than 35 percent. Shale and

limestone outcrops are scattered throughout the association.

This association is suitable for trees. The Wellston soil is suitable for pasture. Runoff and the erosion hazard are the main limitations. (Capability unit VIe-1; woodland group 12)

Ginat Series

The Ginat series consists of deep, poorly drained, nearly level soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. A slowly permeable fragipan begins at a depth of 18 to 30 inches. These soils developed in old mixed alluvium. The native vegetation consisted of mixed hardwood trees. Ginat soils occur on terraces above the Ohio River.

The surface layer, about 9 inches thick, consists of friable silt loam that has brown and reddish-yellow mottles. The uppermost 6 inches is white and medium acid, and the lower part is light gray and very strongly acid. The subsoil, which is about 65 inches thick, is very strongly acid and has strong-brown and yellowish-red mottles. The uppermost 14 inches consists of gray, friable silt loam that has blocky structure. The middle 15 inches consists of a fragipan of gray, firm and brittle silty clay loam that has prismatic structure. The lower part is light-gray, firm silty clay loam that has blocky structure. The underlying material consists of stratified loam, silt loam, and a silty clay loam mottled with yellowish red and yellowish brown. This material is massive. It is light gray in color, friable, and very strongly acid.

The organic-matter content is low. The supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Surface runoff is very slow. The plow layer is strongly acid unless it is limed.

A typical profile of Ginat silt loam, in an abandoned field at a point 1,200 feet west and 800 feet south of the NE. corner of sec. 19, T. 5 S., R. 1 E.

Ap—0 to 6 inches, white (10YR 8/1) silt loam; common, medium, distinct, brown (7.5YR 5/4) and strong-brown (7.5YR 5/6 to 5/8) mottles; moderate, medium, granular structure; friable when moist; numerous crawfish holes; medium acid; abrupt, smooth boundary.

A2g—6 to 9 inches, light-gray (10YR 7/2) silt loam; common, fine, faint, reddish-yellow (7.5YR 6/8) mottles; moderate, medium, granular structure; friable when moist; very strongly acid; clear, smooth boundary.

B1g—9 to 13 inches, light-gray to gray (10YR 6/1) heavy silt loam; common, medium, distinct, reddish-yellow (7.5YR 6/8) and strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist; very strongly acid; clear, smooth boundary.

B2g—13 to 23 inches, gray (10YR 5/1) heavy silt loam; common, medium, distinct, reddish-yellow (7.5YR 6/8) and strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist; very strongly acid; gradual, wavy boundary.

Bx—23 to 38 inches, gray (10YR 5/1) light silty clay loam; common, medium, distinct, reddish-yellow (7.5YR 6/8) and strong-brown (7.5YR 5/8) mottles; moderate, medium, prismatic structure breaking to weak, medium, subangular blocky; firm and brittle when moist; moderately well developed fragipan; very strongly acid; gradual, wavy boundary.

IIB3g—38 to 74 inches, light-gray (10YR 7/1) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6 to 5/8), strong-brown (7.5YR 5/8), and yellowish-red (5YR 4/8) mottles; weak, medium, subangular blocky structure; firm when moist; some rounded pebbles, 1 to 3 inches in diameter; very strongly acid; gradual, wavy boundary.

IICg—74 to 80 inches, light-gray to gray (10YR 6/1) stratified loam, silt loam, and silty clay loam; common, medium, distinct, yellowish-red (5YR 5/8) and yellowish-brown (10YR 5/4) mottles; massive; friable when moist; very strongly acid.

The Ap horizon ranges from grayish brown to white in color. The depth to the fragipan ranges from 18 to 30 inches. The thickness of the solum ranges from 60 to 80 inches. The underlying material contains lenses of sand and gravel in some places.

Ginat silt loam (0 to 2 percent slopes) (Gn).—This soil occurs as areas 3 to 10 acres in size in long, narrow drainageways.

If drained, this soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because the subsoil contains a slowly permeable fragipan that restricts penetration of roots and water. The suitable crops respond well to lime and fertilizer. Crops are subject to drought damage in mid or late summer in years when rainfall is below normal or is unevenly distributed. Wetness is the main limitation. (Capability unit IIIw-3; woodland group 11)

Gullied Land

Gullied land (Gu) consists of severely gullied soils (fig. 5). It occurs throughout the county. Most of the areas are between 3 and 15 acres in size, but some are as much as 40 acres in size. Most of the areas are underlain by sandstone, shale, or limestone bedrock at a depth of 4 to 6 feet. In many places bedrock is exposed at the bottom of gullies. In places soils of the Zanesville, Wellston, Crider, and other series occupy narrow ridges between gullies. In areas underlain by limestone bedrock, the remaining soil material is mostly very plastic, reddish clay. In areas underlain by sandstone or shale, the remaining soil material is mostly friable silt loam and some sand, and in many places there are numerous channery fragments.

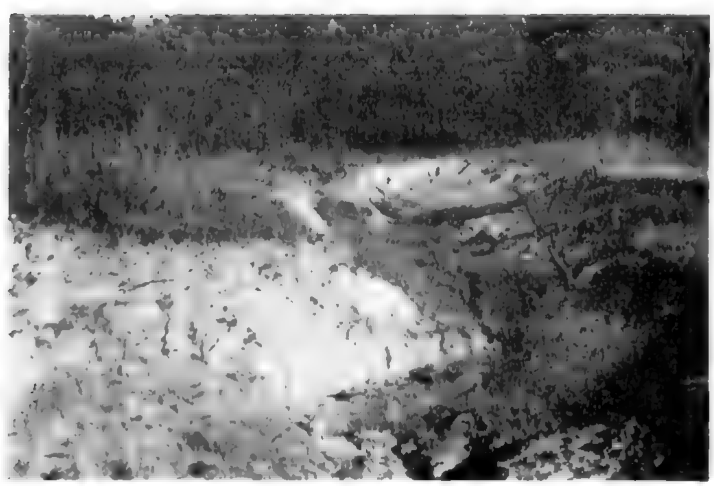

Figure 5.—**Gullied land. Bedrock is exposed at the bottom of many of the gullies.**

Most of the areas are bare of vegetation, but shrubs, weeds, and wild grasses are starting to grow in places. If established, such vegetation helps to stabilize the soil material and to control runoff and provides cover for wildlife. Many of the ridges between gullies are suitable for growing Christmas trees. Runoff and erosion are the main hazards. (Capability unit VIIe-4; woodland group 14)

Haymond Series

The Haymond series consists of deep, well-drained, nearly level soils that have a medium-textured surface layer and subsoil. These soils developed in mixed alluvium. The native vegetation consisted of mixed hardwood trees. Haymond soils occur on bottom lands along the major tributaries of the Ohio River.

The surface layer, about 8 inches thick, consists of dark-brown, friable silt loam. The subsoil, about 24 inches thick, consists of yellowish-brown and dark yellowish-brown, friable silt loam that has granular structure. The underlying material is dark-brown, friable silt loam that has granular structure.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow to ponded.

A typical profile of Haymond silt loam, in a cultivated field at a point 200 feet east and 2,200 feet north of the SW. corner of sec. 20, T. 6 S., R. 3 W.

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable when moist; abundant roots; neutral; abrupt, smooth boundary.

B21—8 to 15 inches, yellowish-brown (10YR 5/4) silt loam; moderate, fine, granular structure; friable when moist; abundant roots; slightly acid; clear, wavy boundary.

B22—15 to 32 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, granular structure; friable when moist; plentiful roots; slightly acid; clear, wavy boundary.

C—32 to 42 inches +, dark-brown (7.5YR 4/4) silt loam; moderate, medium, granular structure to massive; friable when moist; few roots; slightly acid.

The A horizon ranges from dark grayish brown to brown in color. The B and C horizons are medium acid or slightly acid. In some places the C horizon is stratified with thin lenses of sandy material below a depth of about 30 inches.

Haymond silt loam (0 to 2 percent slopes) (Ha).—This soil occurs as long, narrow areas along stream channels. Included in mapping were short, gentle slopes along sloughs and streambanks. Also included were a few small areas of moderately well drained soils that have gray mottles at a depth of 20 to 30 inches.

This soil is well suited to corn, soybeans, meadow, and pasture. These crops respond well to fertilizer. Flooding between December and June is the main hazard. Small grain and legumes are subject to severe damage if flooding is prolonged. (Capability unit I-2; woodland group 8-A)

Henshaw Series

The Henshaw series consists of deep, somewhat poorly drained, nearly level and gently sloping soils that have a medium-textured surface layer and a moderately fine textured subsoil. These soils developed in lacustrine material mantled with silty loess. The native vegetation consisted of mixed hardwood trees. Henshaw soils occur on terraces along the margins of the Ohio River flood plains, in the lower valleys of tributaries of the Ohio River, and along the Anderson River.

The surface layer, about 8 inches thick, consists of dark-brown, friable, neutral silt loam. The subsoil, which is about 50 inches thick, has blocky structure. It is yellowish brown in color and is mottled with gray and light brownish gray. The uppermost 4 inches is friable, strongly acid silt loam. The middle 28 inches is firm, very strongly acid silty clay loam. The lower part consists of layers of friable, slightly acid silt loam and silty clay loam. The underlying material consists of layers of yellowish-brown, friable, calcareous, massive silt loam, silty clay loam, and silty clay that is mottled with gray.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is slow. Surface runoff is slow. The plow layer is strongly acid unless it is limed.

A typical profile of Henshaw silt loam, in a cultivated field at a point 530 feet west and 1,450 feet north of the SE. cor. NE¼ sec. 6, T. 6 S., R. 3 W.

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable when moist; neutral; abrupt, smooth boundary.

B1—8 to 12 inches, yellowish-brown (10YR 5/4) heavy silt loam; common, fine, distinct, gray (10YR 6/1) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable when moist; strongly acid; clear, smooth boundary.

B21t—12 to 28 inches, yellowish-brown (10YR 5/4) silty clay loam; common, fine, distinct, brown (10YR 5/3) and gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm when moist; common, black, soft concretions of iron and manganese; very strongly acid; gradual, wavy boundary.

IIB22t—28 to 40 inches, yellowish-brown (10YR 5/6) silty clay loam; many, fine, distinct, light brownish-gray (2.5Y 6/2) and grayish-brown (2.5Y 5/2) mottles; moderate, medium, angular and subangular blocky structure; firm when moist; thin, light brownish-gray (2.5Y 6/2) clay films on most ped faces; common, black, soft concretions of iron and manganese; very strongly acid; gradual, wavy boundary.

IIB3—40 to 58 inches, yellowish-brown (10YR 5/6) and olive-brown (2.5Y 4/4) layers of heavy silt loam and silty clay loam; common, fine, distinct, grayish-brown (2.5Y 5/2) and light brownish-gray (2.5Y 6/2) mottles; weak to moderate, medium, subangular blocky structure; friable when moist; few, discontinuous, light brownish-gray (2.5Y 6/2) clay films; common, black, soft concretions of iron and manganese; slightly acid; clear, wavy boundary.

IIC—58 to 65 inches, yellowish-brown (10YR 5/6), stratified heavy silt loam, silty clay loam, and silty clay; common, medium, distinct, gray (N 5/0) streaks and mottles; massive; friable when moist; calcareous.

In some places the B2 horizon is silty clay loam below a depth of 30 inches. In some places the C horizon contains lenses of clay and fine sandy loam. The silty loess ranges from 10 to 32 inches in thickness.

Henshaw silt loam, 0 to 2 percent slopes (HeA).—This soil occurs on large, broad terraces. Included in mapping were small areas of moderately eroded soils at the head

of drainageways. Also included was about 40 acres of a soil that developed in a thick deposit of unstratified loess. This inclusion is on the northern edge of Troy.

If drained, this soil is well suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture crops. All of these crops respond well to lime and fertilizer. Wetness is the main limitation. (Capability unit IIw–2; woodland group 5)

Henshaw silt loam, 2 to 6 percent slopes, eroded (HeB2).—This soil occurs as small, elongated areas at the base of steeper soils. It has lost from 3 to 6 inches of the original surface layer through erosion. In places the yellowish-brown subsoil is exposed. Included in mapping were a few small areas of Henshaw silt loam, 0 to 2 percent slopes.

If drained, this soil is well suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture. These crops respond well to lime and fertilizer. Wetness is the main limitation, and erosion is a hazard. (Capability unit IIw–2; woodland group 5)

Huntington Series

The Huntington series consists of deep, well-drained, nearly level soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in recent mixed alluvium. The native vegetation was a mixed hardwood forest. Huntington soils occur on bottom lands along the Ohio River.

The surface layer, about 19 inches thick, consists of friable, neutral silt loam. The uppermost 9 inches is dark brown, and the lower part is very dark grayish brown. The subsoil, more than 34 inches thick, consists of dark-brown, friable, neutral silt loam and silty clay loam that has granular structure.

The organic-matter content is low. The supply of available phosphorus is high, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow.

A typical profile of Huntington silt loam, in a cultivated field at a point 1,900 feet east and 2,700 feet south of the NW. corner of sec. 4, T. 8 S., R. 2 W.

Ap—0 to 9 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A1—9 to 19 inches, very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable when moist; neutral; clear, smooth boundary.

B1—19 to 30 inches, dark-brown (10YR 4/3) heavy silt loam; moderate to weak, fine, granular structure; friable when moist; neutral; clear, smooth boundary.

B2—30 to 54 inches +, dark-brown (10YR 4/3) light silty clay loam; weak, fine, granular structure; friable when moist; neutral.

The Ap horizon ranges from very dark grayish brown to dark yellowish brown. The colors are mostly in a hue of 10YR or 7.5YR to a depth of 30 inches, but in places the hue is 5YR. In places the structure of the B horizon is coarse prismatic or very coarse subangular blocky. Reaction in the B horizon ranges from slightly acid to mildly alkaline.

Huntington silt loam (0 to 2 percent slopes) (Hu).—This soil occurs between sloughs along the Ohio River. New soil material is occasionally deposited during seasonal floods. Included in mapping were a few small areas of Lindside silt loam. Also included were sloping areas along sloughs and steep, short breaks along the Ohio River.

This soil is well suited to corn, soybeans, meadow, and pasture. These crops respond well to fertilizer. Seasonal flooding is the main limitation. Small grain and alfalfa are damaged severely if flooding is prolonged. (Capability unit I–2; woodland group 8–A)

Johnsburg Series

The Johnsburg series consists of deep, somewhat poorly drained, nearly level and gently sloping soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil, part of which is a fragipan. These soils developed in material weathered from acid sandstone, siltstone, or shale mantled with loess. The native vegetation consisted of hardwood trees. Johnsburg soils occur on broad ridgetops throughout the county.

The surface layer, about 7 inches thick, consists of dark grayish-brown, friable, slightly acid silt loam. The subsoil, which is about 53 inches thick, has brownish-gray, gray, and yellowish-brown mottles. It has blocky structure and is extremely acid. The uppermost 15 inches is brownish-yellow and light-gray, friable silt loam. The middle 14 inches consists of a fragipan of gray silty clay loam. The lower part is dark yellowish-brown silty clay loam. Below the subsoil is about 6 inches of yellowish-brown, friable, extremely acid, massive silt loam over partly weathered, stratified sandstone, siltstone, and shale.

The organic-matter content is low. The supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Runoff is slow or medium. The plow layer is strongly acid unless it is limed.

A typical profile of Johnsburg silt loam, in a cultivated field at a point 100 feet east and 2,000 feet north of the SW. corner of sec. 34, T. 4 S., R. 1 W.

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable when moist; slightly acid; abrupt, smooth boundary.

B1—7 to 16 inches, brownish-yellow (10YR 6/6) to yellowish-brown (10YR 5/6) silt loam; many, fine, distinct, light brownish-gray (10YR 6/2) mottles; weak, medium, subangular blocky structure; friable when moist; extremely acid; gradual, wavy boundary.

B2t—16 to 22 inches, light-gray (10YR 6/1) heavy silt loam; many, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist; few light-gray (10YR 7/1) silt coatings on ped surfaces; extremely acid; clear, smooth boundary.

IIBx—22 to 36 inches, gray (10YR 5/1) light silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular blocky; very firm when moist; numerous light-gray (10YR 7/1) silt coatings on ped surfaces; few fragments of shale and sandstone; extremely acid; clear, wavy boundary.

IIB3—36 to 60 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; many, medium, distinct, gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm when moist; few fragments of shale and sandstone; extremely acid; clear, wavy boundary.

IIC1—60 to 66 inches, yellowish-brown (10YR 5/8) silt loam; massive; friable when moist; extremely acid; clear, wavy boundary.

IIC2—66 inches +, stratified, partly weathered sandstone, siltstone, and shale.

The depth to bedrock ranges from 48 to more than 72 inches. The fragipan is more strongly developed in nearly level areas than in gently sloping areas, and mottles are more numerous. The fragipan ranges from 10 to 24 inches in thickness. In places the fragipan developed entirely in loess or partly in loess and partly in material weathered from sandstone, siltstone, and shale. The loess mantle ranges from 18 to 48 inches in thickness.

Johnsburg silt loam, 0 to 2 percent slopes (JoA).—This soil generally occurs as areas 3 to 10 acres in size. A few areas are as much as 40 acres in size. Included in mapping were a few small tracts of Johnsburg silt loam, 2 to 6 percent slopes, eroded.

If drained, this soil is well suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture. It is not suited to alfalfa, because the fragipan restricts roots. The suitable crops respond well to lime and fertilizer. Wetness is the major limitation, but since the fragipan limits the available moisture capacity, lack of moisture in midsummer and late summer is also a limitation if rainfall is below normal or is poorly distributed. (Capability unit IIIw-3; woodland group 5)

Johnsburg silt loam, 2 to 6 percent slopes, eroded (JoB2).—This soil occurs along drainageways and on the side slopes of ridges. It has lost from 3 to 5 inches of the original surface layer through erosion. Included in mapping were a few small areas of slightly eroded and severely eroded soils.

If drained, this soil is well suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture. It is not suited to alfalfa, because the fragipan restricts roots. The suitable crops respond well to lime and fertilizer. Wetness is the major limitation, but since the fragipan limits the available moisture capacity, lack of moisture in midsummer and late summer is also a limitation if rainfall is below normal or is poorly distributed. (Capability unit IIIw-3; woodland group 5)

Lindside Series

The Lindside series consists of deep, moderately well drained, nearly level soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in recent mixed alluvium. The native vegetation consisted of mixed hardwood trees. Lindside soils occur on bottom lands along the Ohio River.

The surface layer, about 6 inches thick, consists of dark yellowish-brown and dark-brown, very friable, neutral silt loam. The subsoil, about 19 inches thick, consists of friable, neutral silt loam. The uppermost 10 inches is dark grayish brown and has granular structure. The lower part is brown mottled with grayish brown and strong brown and has blocky structure. The underlying material consists of light-gray or gray, friable, neutral, massive silty clay loam. It has yellowish-brown, dark-brown, and dark reddish-brown mottles and contains a little gravel.

The organic-matter content is low. The supply of available phosphorus is medium or high, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow or very slow.

A typical profile of Lindside silt loam, in a cultivated field at a point 1,300 feet east and 4,200 feet south of the NW. corner of sec. 25, T. 5 S., R. 1 W.

Ap—0 to 6 inches, dark-brown to dark yellowish-brown (10YR 3/4 to 4/4) silt loam; weak, medium, granular structure; very friable when moist; high worm activity and many worm casts; neutral; clear, smooth boundary.

B21—6 to 16 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable when moist; a few soft, black (10YR 2/1) concretions of iron and manganese; neutral; clear, smooth boundary.

B22—16 to 25 inches, brown (10YR 5/3) silt loam; common, medium, faint, grayish-brown (10YR 5/2) and strong-brown (7.5YR 5/6) mottles; weak, coarse, subangular blocky structure; friable when moist; neutral; clear, wavy boundary.

C—25 to 60 inches +, light-gray to gray (10YR 6/1) light silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) and brown to dark-brown (7.5YR 4/4) and dark reddish-brown (5YR 3/2 to 3/4) mottles; massive; friable when moist; some rounded pebbles, 2 to 3 inches in diameter; few soft, black (10YR 5/1) concretions of iron and manganese; neutral.

The Ap horizon is brown, dark brown, or dark yellowish brown. The B21 horizon is dark grayish brown or dark brown. The B22 horizon ranges from brown to light olive brown. The C horizon ranges from gray to light olive gray. In places the structure of the B horizon is prismatic.

Lindside silt loam (0 to 2 percent slopes) (Ln).—This soil occasionally receives deposits of new soil material during periods of flooding. Included in mapping were a few small areas of Huntington silt loam and Newark silt loam.

This soil is well suited to corn, soybeans, meadow, and pasture. These crops respond well to fertilizer. Flooding, which occurs mainly between December and June, is the principal hazard. Small grain and alfalfa are damaged severely if flooding is prolonged. (Capability unit I-2; woodland group 2)

Markland Series

The Markland series consists of deep, well drained and moderately well drained, sloping to steep, eroded soils that have a medium-textured or moderately fine textured surface layer and a moderately fine textured and fine textured subsoil. These soils developed in calcareous lacustrine material. The native vegetation consisted of mixed hardwood trees. Markland soils occur on terraces along major tributaries of the Ohio River, along the margin of the Ohio River flood plain, and in the upper valleys of the Anderson River and Sulphur Fork Creek.

The surface layer, about 7 inches thick, consists of friable, neutral silt loam. The uppermost 3 inches is dark grayish brown, and the lower part is brown. The subsoil, about 21 inches thick, is medium acid and strongly acid and has blocky structure. The uppermost 5 inches is yellowish-brown, friable, medium acid silty clay loam. The lower part is dark-brown, very firm, medium and strongly acid silty clay. Below this is firm,

calcareous, massive, stratified clay, silty clay loam, and silt loam. This material is yellowish brown mottled with light brownish gray.

The organic-matter content is low, and fertility is low. The available moisture capacity is high, and permeability is slow. Surface runoff is medium to very rapid.

A typical profile of Markland silt loam, in a wooded area at a point 2,100 feet east and 1,300 feet north of the SW. corner of sec. 14, T. 5 S., R. 1 W.

O1—½ inch to 0, partly decomposed leaves.

A1—0 to 3 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure, friable when moist; plentiful roots; neutral; abrupt, smooth boundary.

A2—3 to 7 inches, brown (10YR 5/3) silt loam; moderate, medium, granular structure; friable when moist; plentiful roots; neutral; clear, smooth boundary.

B1t—7 to 12 inches, yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; firm when moist; few, thin, discontinuous, brown (10YR 4/3) clay films on ped faces; plentiful roots; medium acid; clear, smooth boundary.

B21t—12 to 20 inches, dark-brown (10YR 4/3) silty clay; strong, medium, angular blocky structure; very firm when moist; thin, dark yellowish-brown (10YR 4/4) clay films on all ped faces; few roots; strongly acid; clear, wavy boundary.

B22t—20 to 28 inches, dark-brown (10YR 4/3) silty clay; strong, medium, angular blocky structure; very firm when moist; thin, dark yellowish-brown (10YR 4/4) clay films on all ped faces; thin, pale-brown (10YR 6/3) silt coatings in old root zones and on some ped faces; few roots; medium acid; clear, wavy boundary.

C—28 inches +, yellowish-brown (10YR 5/4) stratified clay and silty clay loam with some layers of silt loam; many, medium, distinct, dark yellowish-brown (10YR 4/4) and light brownish-gray (10YR 6/2) mottles; massive; firm when moist; few roots; many secondary lime concretions at a depth of 28 to 40 inches; calcareous.

The surface layer ranges from dark grayish brown to yellowish brown in color. The B horizon ranges from silty clay loam to clay in texture. The depth to calcareous material ranges from 8 to 30 inches. In places there is a mantle of silty loess 6 to 12 inches thick.

Markland silt loam, 12 to 18 percent slopes, eroded (MaD2).—This soil occurs on short slopes and breaks above bottom lands. It has lost from 3 to 5 inches of the original surface layer through erosion. In many places the surface layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Included in mapping were a few small areas of steep, slightly eroded soils.

This soil is suited to permanent pasture. Erosion and runoff are hazards. (Capability unit VIe–1; woodland group 18)

Markland silt loam, 18 to 25 percent slopes, eroded (MaE2).—This soil occurs along drainageways and on short, narrow breaks along major streams. It has lost from 3 to 5 inches of the original surface layer through erosion. In many places the surface layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Included in mapping were a few small areas of severely eroded soils.

This soil is suited to permanent pasture. Erosion and runoff are hazards. (Capability unit VIe–1; woodland group 18)

Markland silty clay loam, 6 to 12 percent slopes, severely eroded (MkC3).—This soil occurs mainly in valleys along the upper part of the Anderson River and along Sulphur Fork Creek. It has lost 5 inches or more of the original surface layer through erosion. The present surface layer is mainly yellowish-brown silty clay loam. Included in mapping were a few small areas of slightly and moderately eroded soils.

This soil is suited to permanent pasture. Erosion and runoff are the main hazards. (Capability unit VIe–1; woodland group 18)

Markland silty clay loam, 12 to 18 percent slopes, severely eroded (MkD3).—This soil occurs on short slopes and breaks above bottom lands. It has lost 5 inches or more of the original surface layer through erosion. The present surface layer is mainly yellowish-brown silty clay loam. There are a few gullies. Included in mapping were a few small areas of silty clay and a few small areas of moderately eroded soils.

This soil is suited to permanent pasture. Erosion and runoff are the main hazards. (Capability unit VIe–1; woodland group 18)

Markland silty clay loam, 18 to 25 percent slopes, severely eroded (MkE3).—This soil occurs on short breaks on the edge of terraces near the Ohio River and along its major tributaries. It has lost 5 inches or more of the original surface layer through erosion. The present surface layer is mainly yellowish-brown silty clay loam. Included in mapping were a few small areas of very steep soils and a few areas of moderately eroded soils.

This soil is suited to permanent pasture. Erosion and runoff are the main hazards. (Capability unit VIe–1; woodland group 18)

Markland silty clay loam, 25 to 35 percent slopes, severely eroded (MkF3).—This soil occurs as narrow, elongated areas along drainageways and on short breaks along the edges of terraces. It has lost 5 inches or more of the original surface layer through erosion. The present surface layer is mainly yellowish-brown silty clay loam. Included in mapping were a few small areas of very steep and extremely steep soils and a few small areas of slightly and moderately eroded soils.

This soil is suited to trees and native grasses. It is not suited to cultivation. Areas that have a good cover of grass are suitable for limited grazing. Erosion and runoff are the main hazards. Permanent vegetation helps to check runoff and control erosion. (Capability unit VIIe–1; woodland group 18)

McGary Series

The McGary series consists of deep, somewhat poorly drained soils that have a medium-textured surface layer and a moderately fine textured and fine textured subsoil. These soils developed in calcareous lacustrine material. The native vegetation consisted of mixed hardwood trees. McGary soils occur on bottom lands in the upper valleys of the Anderson River, Sulphur Fork Creek, and Middle Fork Creek.

The surface layer, about 10 inches thick, consists of friable, neutral silt loam. The uppermost 8 inches is grayish brown, and the lower part is light brownish gray. The subsoil, about 33 inches thick, has blocky structure and is grayish brown with gray, brownish-yellow, and yellowish-brown mottles. The uppermost 8

inches is firm, strongly acid silty clay loam. The lower part is very firm, slightly acid and neutral silty clay. The underlying material is very firm, neutral, massive silty clay. It is grayish brown mottled with yellowish brown.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is very slow. Runoff is slow to ponded. The plow layer is strongly acid unless it is limed.

A typical profile of McGary silt loam, in a cultivated field 300 feet west and 1,700 feet south of the NE. corner of sec. 36, T. 4 S., R. 4 W.

Ap—0 to 8 inches, grayish-brown (10YR 5/2) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—8 to 10 inches, light brownish-gray (10YR 6/2) heavy silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

IIB21t—10 to 18 inches, grayish-brown (10YR 5/2) silty clay loam; common, medium, distinct, gray (10YR 6/1) and brownish-yellow (10YR 6/6) mottles; moderate, medium, subangular blocky structure; firm when moist; strongly acid; clear, smooth boundary.

IIB22t—18 to 30 inches, grayish-brown (10YR 5/2) silty clay; common, medium, distinct, gray (10YR 6/1) and brownish-yellow (10YR 6/6) mottles; weak, medium to coarse, prismatic structure breaking to strong, medium, angular blocky; very firm when moist; slightly acid; gradual, wavy boundary.

IIB23t—30 to 43 inches, grayish-brown (10YR 5/2) silty clay with common, medium, distinct, yellowish-brown (10YR 5/6) and gray (10YR 6/1) mottles; moderate, medium, prismatic structure breaking to moderate, medium, angular blocky; very firm when moist; neutral; clear, irregular boundary.

IIC—43 to 63 inches +, grayish-brown (10YR 5/2) silty clay; common, fine, distinct, yellowish-brown (10YR 5/6) mottles; massive; very firm when moist; neutral; calcareous below a depth of 63 inches.

The Ap horizon ranges from gray to dark gray and grayish brown in color. The A2 horizon has been mixed with the Ap horizon in some places. A thin B1 horizon occurs in some profiles. The depth to the C horizon ranges from 35 to 50 inches. The texture of the C horizon ranges from silty clay loam to clay. In some places soft or slightly hard, calcareous nodules occur in the upper part of the C horizon.

McGary silt loam (0 to 2 percent slopes) (Mr).—Included with this soil in mapping were a few small areas of moderately eroded soils on short, gentle slopes. Also included was about 40 acres of a gray soil that has a moderately fine textured surface layer. This tract occurs on a bench along Middle Fork Creek, southwest of Bristow.

If drained, this soil is suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture crops. It is not well suited to alfalfa, because of excess moisture in the lower layers in winter and early in spring. The suitable crops respond well to lime and fertilizer. Wetness is the main limitation. (Capability unit IIIw-3; woodland group 5)

Muskingum Series

The Muskingum series consists of stony, moderately deep, well-drained, moderately steep to very steep soils (fig. 6) that have a channery, medium-textured surface layer and subsoil. These soils developed in material weathered from sandstone, siltstone, and shale. The native vegetation consisted of mixed hardwood trees. Muskingum soils occur on uplands.

Figure 6.—**Profile of Muskingum channery silt loam.**

The surface layer, about 8 inches thick, consists of friable, strongly acid channery silt loam. The uppermost 2 inches is very dark grayish brown, and the lower part is brown. The subsoil, about 17 inches thick, consists of yellowish-brown, friable, very strongly acid channery silt loam that has blocky structure. The underlying material is yellowish-brown, friable, very strongly acid, very channery silt loam. Bedrock is at a depth of 34 inches.

The organic-matter content is low. The supply of available plant nutrients is low. The available moisture capacity is low or medium, and permeability is moderate. Surface runoff is medium to very rapid.

A typical profile of Muskingum channery silt loam, stony phase, in a wooded area, at a point 200 feet west and 1,400 feet north of the SE. corner of sec. 11, T. 4 S., R. 3 W.

O1—½ inch to ¼ inch, partly decomposed leaf litter.

O2—¼ inch to 0, very dark grayish-brown organic material mixed with some mineral material.

A1—0 to 2 inches, very dark grayish-brown (10YR 3/2) channery silt loam; weak, fine, granular structure; friable when moist; about 25 percent, by volume, is channery rock; strongly acid; clear, wavy boundary.

A2—2 to 8 inches, brown (10YR 5/3) channery silt loam; weak, thin, platy structure; friable when moist; about 20 percent is coarse fragments of siltstone and fine-grained sandstone; strongly acid; gradual, smooth boundary.

B2—8 to 20 inches, yellowish-brown (10YR 5/4) channery silt loam; weak, medium, subangular blocky structure; friable when moist; about 25 percent, by volume, is coarse fragments up to 6 inches in size; very strongly acid; gradual, wavy boundary.

B3—20 to 25 inches, yellowish-brown (10YR 5/4) channery silt loam; weak, medium, subangular blocky structure; friable when moist; about 40 percent, by volume, is coarse fragments up to 6 inches in size; very strongly acid; gradual, wavy boundary.

C—25 to 34 inches, yellowish-brown (10YR 5/4) very channery silt loam; massive; friable when moist; more than 50 percent is coarse fragments that are larger in size and more numerous with depth; very strongly acid; abrupt, irregular boundary.

R—34 inches +, consolidated siltstone and fine-grained sandstone; some silt loam material in cracks to a depth of 3 to 5 feet.

The B horizon ranges from 8 to 20 inches in thickness. The amount of channery fragments in the B horizon ranges from 20 to 50 percent. The stones on the surface and throughout the profile range from few to many. The depth to bedrock ranges from 20 to 36 inches. In areas underlain by thick-bedded sandstone, there are numerous cracks and crevices in the bedrock, which are filled with silt and sandy material to a depth of 3 feet to more than 5 feet. In these areas roots follow the cracks to a considerable depth.

Muskingum-Gilpin association, 35 to 70 percent slopes (MsG).—This association occurs in the uplands, mainly in the southern and eastern parts of the county. The soils overlie sandstone and shale.

Muskingum channery silt loam, stony phase, makes up about 60 percent of the association. It has a profile like that described for the series.

Gilpin silt loam, a moderately deep soil over bedrock, makes up about 30 percent of the association. Channery fragments occur throughout the subsoil but make up less than 20 percent of the volume. The north-facing slopes have a thin mantle of loess, less than 20 inches thick, over the material weathered from bedrock.

Inclusions of other soils make up the remaining 10 percent of the association. Small tracts of Corydon stony silt loam occur in the southeastern and eastern parts of the county. Small areas of a strongly acid soil, less than a foot deep over clayey shale, are also included. This shallow soil occurs as a rim around the base of slopes; in the eastern part of the county, the areas extend about a quarter of the way up the slopes. Also included are small, narrow areas of deep, colluvial soils at the base of slopes. These colluvial soils contain large amounts of channery fragments and stones. In addition, areas are included where the slope range is less than 25 percent. Escarpments of thick-bedded sandstone occur throughout the areas. Shale and limestone bedrock crop out in a few places.

This association is suitable for trees. It is not suitable for cultivated crops. Runoff and the erosion hazard are the main limitations. (Capability unit VIIe-1; woodland group 12)

Newark Series

The Newark series consists of deep, somewhat poorly drained, nearly level soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in recent alluvium. The native vegetation consisted of mixed hardwood trees. Newark soils occur on bottom lands along the Ohio River.

The surface layer, about 9 inches thick, consists of brown or dark-brown, friable, neutral silt loam. The lower 2 inches has very pale brown and brownish-yellow mottles. The subsoil, about 15 inches thick, consists of grayish-brown, friable, neutral and slightly acid silt loam that has granular structure. It is mottled with brownish yellow and yellowish brown. The underlying material is light brownish-gray, friable, medium acid, massive silty clay loam that has yellowish-brown and brownish-yellow mottles.

The organic-matter content is low. The supply of available phosphorus is medium to high, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderately slow. Surface runoff is slow or very slow.

A typical profile of Newark silt loam, in a cultivated field at a point 2,200 feet east and 2,100 feet south of the NW. corner of sec. 17, T. 5 S., R. 1 E.

Ap—0 to 7 inches, brown to dark-brown (10YR 4/3) silt loam; few, fine, faint, very pale brown (10YR 7/3) and brownish-yellow (10YR 6/8) mottles; moderate, medium, granular structure; friable when moist; some soft, black (10YR 2/1) concretions of iron and manganese; slightly acid; clear, smooth boundary.

A1—7 to 9 inches, brown to dark-brown (10YR 4/3) silt loam; a few, fine, distinct, very pale brown (10YR 7/3) and brownish-yellow (10YR 6/8) mottles; weak, medium, granular structure; friable when moist; neutral; clear, smooth boundary.

B21—9 to 12 inches, light brownish-gray (10YR 6/2) to grayish-brown (10YR 5/2) silt loam; common, medium, distinct, brownish-yellow (10YR 6/8) and yellowish-brown (10YR 5/8) mottles; weak, medium, granular structure; friable when moist; many soft, black (10YR 2/1) concretions of iron and manganese; neutral; gradual, wavy boundary.

B22—12 to 24 inches, grayish-brown (2.5Y 5/2) silt loam; many, medium, distinct, brownish-yellow (10YR 6/8) and yellowish-brown (10YR 5/8) mottles; weak, medium, granular structure; friable when moist; many soft, black (10YR 2/1) concretions of iron and manganese; slightly acid; gradual, wavy boundary.

C—24 to 60 inches +, light brownish-gray (2.5Y 6/2) light silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) and brownish-yellow (10YR 6/8) mottles; massive; friable when moist; many soft, black (10YR 2/1) concretions of iron and manganese; medium acid.

The Ap horizon is dark brown or brown. The C horizon ranges in color from grayish brown to gray. The B and C horizons range from silt loam to light silty clay loam in texture.

Newark silt loam (0 to 2 percent slopes) (Ne).—This soil occurs as depressions in narrow old sloughs and waterways along the Ohio River. Included in mapping were a few small areas of moderately fine textured soils and a few of very poorly drained soils.

If drained, this soil is suited to corn and soybeans. It is also well suited to pasture. These crops respond well to

fertilizer. Wetness is a limitation, and flooding is a hazard. Small grain and alfalfa are damaged severely if flooding is prolonged. (Capability unit IIw-7; woodland group 13)

Patton Series

The Patton series consists of deep, very poorly drained, nearly level soils that have a moderately fine textured surface layer and a moderately fine textured and fine textured subsoil. These soils developed in lacustrine material mantled with loess. The native vegetation consisted of hardwood trees, swamp grass, and sedges. Patton soils occupy depressions on terraces along the margin of the Ohio River flood plain and lower valleys along tributaries of the Ohio River.

The surface layer, about 12 inches thick, consists of black, firm, neutral silty clay loam. The lower part has yellowish-brown mottles. The subsoil, about 36 inches thick, has blocky structure. The uppermost 21 inches is dark grayish-brown, firm, slightly acid silty clay loam mottled with shades of gray and brown. The lower part is dark yellowish-brown, very firm, medium acid silty clay mottled with grayish brown and black. The underlying material consists of dark yellowish-brown, firm, calcareous, massive silty clay loam that has olive-brown and grayish-brown mottles.

The organic-matter content is high. The supplies of available phosphorus and potassium are medium or high. The available moisture capacity is high, and permeability is slow. Surface runoff is slow to ponded.

A typical profile of Patton silty clay loam, in a pasture at a point 530 feet east and 1,500 feet north of the SW. corner of sec. 15, T. 6 S., R. 2 W.

Ap—0 to 8 inches, black (10YR 2/1) silty clay loam; moderate, medium, granular structure; firm when moist; neutral; abrupt, smooth boundary.

A1—8 to 12 inches, black (10YR 2/1) silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm when moist; neutral; clear, smooth boundary.

B21g—12 to 22 inches, dark grayish-brown (2.5Y 4/2) silty clay loam; many, medium, distinct, grayish-brown (10YR 5/2) and pale-brown (10YR 6/3) mottles; moderate, medium and coarse, subangular blocky structure; firm when moist; slightly acid; gradual, wavy boundary.

B22g—22 to 33 inches, dark grayish-brown (2.5Y 4/2) silty clay loam; many, medium, distinct, gray (10YR 5/1) and light brownish-gray (10YR 6/2) mottles; strong, coarse, subangular blocky structure; firm when moist; slightly acid; clear, wavy boundary.

IIB23g—33 to 48 inches, dark yellowish-brown (10YR 4/4) silty clay; many, moderate, distinct, grayish-brown (10YR 5/2) and black (10YR 2/1) mottles; weak, coarse, subangular blocky structure; very firm when moist; lenses of light-gray (10YR 7/1) sand; medium acid; gradual, wavy boundary.

IICg—48 to 72 inches +, dark yellowish-brown (10YR 4/4) silty clay loam; many, medium, distinct, olive-brown (2.5Y 4/4) and grayish-brown (10YR 5/2) mottles; massive; firm when moist; calcareous.

The depth to the C horizon ranges from 40 to 60 inches. In places the texture of the C horizon is silt loam, silty clay loam, silty clay, or clay.

Patton silty clay loam (0 to 2 percent slopes) (Pa).—This soil occurs mainly as areas 3 to 10 acres in size. Included in mapping were a few small areas where the original black surface layer is covered with 4 to 10 inches of alluvium consisting of light-colored silt loam.

If drained, this soil is suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture. All of these crops respond well to fertilizer. Wetness is the main limitation. (Capability unit IIw-1; woodland group 11)

Pekin Series

The Pekin series consists of deep, moderately well drained, nearly level and gently sloping soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil, the lower part of which is a fragipan. These soils developed in silty alluvium over stratified material. The native vegetation was a mixed hardwood forest. Pekin soils occur on terraces along major tributaries of the Ohio River.

The surface layer, about 10 inches thick, consists of brown or dark-brown, friable, neutral silt loam. The subsoil is about 48 inches thick. The uppermost 16 inches consists of yellowish-brown, friable, very strongly acid silt loam that has blocky structure. The lower part is a fragipan of strong-brown, very strongly acid silty clay loam that has prismatic structure and is mottled with gray. The underlying material is light-gray or gray, friable, very strongly acid, massive, stratified silt, silt loam, and fine sand. This material has strong-brown and yellowish-brown mottles.

The organic-matter content is low. The supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Surface runoff is slow or medium. The plow layer is strongly acid unless it is limed.

A typical profile of Pekin silt loam, in a cultivated field at a point 400 feet east and 600 feet south of the NW. corner of sec. 35, T. 3 S., R. 3 W.

Ap—0 to 10 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable when moist; numerous roots; evidence of much worm activity; neutral; abrupt, smooth boundary.

B1—10 to 16 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, subangular blocky structure; friable when moist; few roots; very strongly acid; clear, smooth boundary.

B2t—16 to 26 inches, yellowish-brown (10YR 5/6) heavy silt loam; common, medium, distinct, light-gray (10YR 7/2) and strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist; few black (10YR 2/1) concretions of iron and manganese; very strongly acid; clear, smooth boundary.

Bx—26 to 58 inches, strong-brown (7.5YR 5/8) light silty clay loam; many, medium, distinct, light-gray to gray (10YR 6/1) mottles; moderate, coarse, prismatic structure; massive inside of peds; firm when moist; weakly developed fragipan; some peds have brown (7.5YR 5/4) clay films; few red (2.5YR 4/8) and black (10YR 2/1) concretions of iron and manganese; very strongly acid; clear, smooth boundary.

IIC—58 to 72 inches +, light-gray to gray (10YR 6/1) stratified silt, silt loam, and fine sand; many, coarse, distinct, strong-brown (7.5YR 5/8) and yellowish-brown (10YR 5/8) mottles; massive; friable when moist; few, soft, black (10YR 2/1) concretions of iron and manganese; very strongly acid.

The Ap horizon ranges from dark grayish brown to dark yellowish brown in color. The B horizon ranges from yellowish brown to dark yellowish brown and strong brown. Its texture ranges from silt loam and silty clay loam to clay loam and sandy clay loam. It is strongly acid to extremely acid. The C horizon ranges from yellowish brown to light gray in color and from medium acid to very strongly acid in reaction. The depth to the C horizon ranges from 40 to more than 70 inches. In places the C horizon contains thin lenses of clay, loam, and sandy loam.

Pekin silt loam, 0 to 2 percent slopes (PeA).—This soil occurs as long, narrow areas. Included in mapping were a few small areas where the surface layer is loam or fine sandy loam. Also included were a few small areas of gently sloping, moderately eroded soils.

This soil is well suited to corn, soybeans, small grain, meadow, and pasture. It is not suited to alfalfa, because the fragipan restricts the roots. The suitable crops respond well to lime and fertilizer. Wetness early in spring is the major limitation, but since the fragipan limits the available moisture capacity, lack of moisture in midsummer and late summer is also a limitation if rainfall is below normal or is poorly distributed. (Capability unit I–1; woodland group 1)

Pekin silt loam, 2 to 6 percent slopes, eroded (PeB2).—This soil occurs as long, narrow areas. It has lost from 3 to 6 inches of the original surface layer through erosion. In most places the plow layer is a mixture of the rest of the original surface layer and part of the subsoil. Included in mapping were a few small areas of a soil that has a surface layer of loam or fine sandy loam. Also included were a few small areas of nearly level, slightly eroded soils and a few small areas of severely eroded soils.

This soil is well suited to corn, soybeans, small grain, meadow, and pasture. It is not suited to alfalfa, because the fragipan restricts the roots. The suitable crops respond well to lime and fertilizer. Erosion is the main hazard. Wetness early in spring is a limitation, but since the fragipan limits the available moisture capacity, lack of moisture in midsummer and late summer is also a limitation if rainfall is below normal or is poorly distributed. (Capability unit IIe–7; woodland group 1)

Philo Series

The Philo series consists of deep, moderately well drained, nearly level soils that have a medium-textured surface layer and subsoil. These soils developed in alluvium. The native vegetation consisted of mixed hardwood trees. Philo soils occur on bottom lands along tributaries of the Anderson and Ohio Rivers.

The surface layer, about 8 inches thick, consists of dark-brown, friable, slightly acid silt loam. The subsoil, about 17 inches thick, consists of brown and grayish-brown, friable, strongly acid and very strongly acid silt loam that has granular structure. The lower 10 inches has dark-brown mottles. Below this is grayish-brown, friable, very strongly acid loam. This material is massive and has dark yellowish-brown mottles.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow. The plow layer is strongly acid unless it is limed.

A typical profile of Philo silt loam, in a meadow at a point 2,400 feet east and 1,400 feet south of the NW. corner of sec. 20, T. 3 S., R. 3 W.

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; moderate, fine to medium, granular structure; friable when moist; slightly acid; abrupt, smooth boundary.

B21—8 to 15 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable when moist; strongly acid; clear, smooth boundary.

B22—15 to 25 inches, grayish-brown (10YR 5/2) light silt mon, medium, distinct, dark yellowish-brown (10YR 4/3) mottles; weak, fine, granular structure; friable when moist; very strongly acid; clear, smooth boundary.

C—25 to 42 inches +, grayish-brown (10YR 5/2) loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; massive; friable when moist; very strongly acid.

The Ap horizon ranges from dark grayish brown to brown. The depth to the C horizon ranges from 24 to 36 inches. In places this horizon is stratified with thin lenses of fine sandy loam. The depth to sandstone and shale bedrock is 36 to 60 inches, or more.

Philo silt loam (0 to 2 percent slopes) (Ph).—This soil occurs as long, narrow areas along stream channels. Included in mapping were a few small areas of gently sloping soils and a few small areas of somewhat poorly drained soils.

This soil is well suited to corn, soybeans, meadow, and pasture. It is not well suited to alfalfa, because the water table is high in winter and in the early part of spring. Flooding is a hazard, and wetness is a slight limitation. Small grain is damaged severely if flooding is prolonged. The suitable crops respond well to lime and fertilizer. (Capability unit I–2; woodland group 8–A)

Pope Series

No soils typical of the Pope series were mapped in Perry County. Pope loam, channery subsoil variant, is a deep, well-drained, nearly level soil that has a medium-textured and moderately coarse textured surface layer over moderately coarse textured material. This soil developed in alluvium. The native vegetation was a mixed hardwood forest. Pope loam, channery subsoil variant, occurs on bottom lands along the upper parts of tributaries of the Anderson and Ohio Rivers.

The surface layer, about 9 inches thick, consists of dark-brown, friable soil material. The uppermost 5 inches is medium acid loam, and the lower part is strongly acid fine sandy loam. Below the surface layer is about 9 inches of strong-brown, very friable, strongly acid sandy loam that has granular structure. Channery sandy loam, sand, and gravel begin at a depth of 9 to 24 inches. This material is strongly acid and massive. More than half of it is sandstone and shale.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is low, and permeability is moderately rapid. Surface runoff is slow. The plow layer is strongly acid unless it is limed.

A typical profile of Pope loam, channery subsoil variant, in an abandoned field at a point 1,200 feet east and 1,200 feet south of the NW. corner of sec. 22, T. 4 S., R. 3 W.

Ap—0 to 5 inches, dark-brown (10YR 4/3) loam; weak, medium, granular structure; friable when moist; medium acid; abrupt, smooth boundary.

A2—5 to 9 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; friable when moist; strongly acid; clear, wavy boundary.

C1—9 to 18 inches, strong-brown (7.5YR 5/6) sandy loam; weak, fine, granular structure; very friable when moist; strongly acid; abrupt, smooth boundary.

IIC2—18 to 42 inches +, channery sandy loam, sand, and gravel; massive; strongly acid.

The A horizon ranges from dark grayish brown to brown in color. The C1 horizon ranges from loam to sandy loam in texture.

Pope loam, channery subsoil variant (0 to 2 percent slopes) (Po).—This soil occurs as narrow areas on bottom lands along streams. Included in mapping were a few small areas of gently sloping soils, a few of moderately well drained and somewhat poorly drained soils, a few of deep loams or sandy loams, and a few areas where the plow layer is fine sandy loam or sandy loam.

This soil is suited to corn, soybeans, meadow, and pasture, but not to small grain and alfalfa. The main limitations are flooding in winter and spring, wetness early in spring, and droughtiness in midsummer and late summer. Crops are severely damaged by drought in years when rainfall is below normal or is unevenly distributed. (Capability unit IIIw–11; woodland group 8–B)

Princeton Series

The Princeton series consists of deep, well-drained, gently sloping and strongly sloping soils that have a moderately coarse textured or medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in wind-deposited, calcareous sand and coarse silt. The native vegetation was a mixed hardwood forest. Princeton soils occur on uplands.

The surface layer, about 15 inches thick, consists of friable fine sandy loam. The uppermost 10 inches is dark grayish brown and is medium acid. The lower part is brown and strongly acid. The subsoil, about 33 inches thick, is strongly acid and has blocky structure. The uppermost 5 inches is brown, friable loam. The middle 20 inches is strong-brown, firm loam to clay loam. The lower part is strong-brown, friable fine sandy loam. The underlying material is pale-brown, loose, neutral and calcareous, massive fine sand that contains bands of brown or dark-brown loamy sand, 1/4 inch to 2 inches thick.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is medium, and permeability is moderate. Runoff is slow to rapid. The plow layer is strongly acid unless it is limed.

A typical profile of Princeton fine sandy loam, in a pasture at a point 200 feet east and 1,700 feet south of the NW. corner of sec. 33, T. 7 S., R. 2 W.

Ap—0 to 10 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak, fine, granular structure; friable when moist; medium acid; abrupt, smooth boundary.

A2—10 to 15 inches, brown (10YR 5/3) fine sandy loam; weak, medium, platy structure; friable when moist; strongly acid; clear, smooth boundary.

B1t—15 to 20 inches, brown (7.5YR 5/4) loam; weak, medium, subangular blocky structure; friable when moist; strongly acid; clear, smooth boundary.

B21t—20 to 40 inches, strong-brown (7.5YR 5/6) loam to clay loam; moderate, medium, subangular blocky structure; firm when moist; many ped faces coated with thin, dark-brown (7.5YR 4/4) clay films; strongly acid; clear, smooth boundary.

B22t—40 to 48 inches, strong-brown (7.5YR 5/6) fine sandy loam; weak, medium, subangular blocky structure; friable when moist; strongly acid; abrupt, wavy boundary.

CB—48 to 74 inches, pale-brown (10YR 6/3) fine sand; bands of dark-brown (7.5YR 4/4) loamy sand, 1 to 2 inches thick and 4 to 8 inches apart; bands are thicker and closer together in the upper part of the horizon but are thinner and farther apart in the lower part; massive and single grain; loose when moist; neutral; abrupt, wavy boundary.

C—74 to 86 inches +, pale-brown (10YR 6/3) fine sand; some thin layers of dark-brown (7.5YR 4/4) loamy sand, 8 to 12 inches apart and less than 1 inch thick; single grain; loose when moist; mildly calcareous.

The A horizon ranges from dark gray to brown in color and from fine sandy loam to loam in texture. The B horizon ranges from yellowish brown to strong brown in color and from fine sandy loam to sandy clay loam and clay loam in texture. The C horizon ranges from loamy fine sand to fine sand in texture. The depth to the C horizon ranges from 36 inches to more than 60 inches. The depth to calcareous material ranges from 3 to 8 feet.

Princeton fine sandy loam, 2 to 6 percent slopes, eroded (PrB2).—This soil occurs on ridgetops and foot slopes. It has lost from 5 to 10 inches of the original surface layer through erosion. In many places the plow layer is a mixture of the rest of the surface layer and the upper part of the subsoil. Included in mapping were a few small areas of loamy fine sand and a few areas of nearly level soils. Also included were a few small areas of severely eroded soils.

This soil is suited to corn, soybeans, small grain, meadow, pasture, and such orchard crops as peaches and apples. It is especially well suited to alfalfa. These crops respond well to lime and fertilizer. Erosion is the main hazard. Drought damage is likely if dry periods are prolonged. (Capability unit IIe–3; woodland group 2)

Princeton loam, 12 to 25 percent slopes, severely eroded (PsE3).—This soil occurs on breaks below ridgetops. It has lost 10 inches or more of the original surface layer through erosion. In most places the plow layer consists of the upper part of the subsoil. There are some deep and shallow gullies. Included in mapping were a few small areas of loamy fine sand and a few areas of moderately eroded soils.

This soil is well suited to alfalfa. It is also suited to meadow, pasture, and such orchard crops as apples and peaches. All of these crops respond well to lime and fertilizer. Runoff and erosion are the main hazards. Drought damage is likely if dry periods are prolonged. (Capability unit VIe–1; woodland group 2)

Rahm Series

The Rahm series consists of deep, somewhat poorly drained, nearly level soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. These soils developed in 18 to 30 inches of recent, neutral alluvium over old, strongly acid

alluvium. The native vegetation consisted of mixed hardwood trees. Rahm soils occupy bottom lands along the Ohio River.

The surface layer, about 7 inches thick, consists of dark-brown, friable, neutral silt loam. The subsoil is more than 46 inches thick. The upper 23 inches is yellowish-brown, friable, neutral and strongly acid silt loam that has granular and blocky structure. It has a few pale-brown and light-gray mottles. The lower part is light brownish-gray, firm, very strongly acid silty clay loam that has blocky structure and contains yellowish-brown mottles.

The organic-matter content is low. The supplies of available phosphorus and potassium are medium or high. The available moisture capacity is high, and permeability is moderately slow. Surface runoff is slow.

A typical profile of Rahm silt loam, in a cultivated field at a point 1,400 feet west and 900 feet south of the NE. corner of sec. 30, T. 5 S., R. 1 E.

Ap—0 to 7 inches, dark-brown (10YR 3/3) (crushed) to dark-brown (10YR 4/3) to dark yellowish-brown (10YR 3/4) silt loam; moderate, medium, granular structure; friable when moist; plentiful roots; numerous mica flakes; neutral; abrupt, smooth boundary.

B21—7 to 13 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, pale-brown (10YR 6/3) and very pale brown (10YR 7/3) mottles; moderate, medium, granular structure; friable when moist; abundant roots; root zones filled with dark yellowish-brown (10YR 3/4) silt; numerous concretions of iron and manganese; numerous mica flakes; neutral; clear, smooth boundary.

B22—13 to 23 inches, yellowish-brown (10YR 5/4) silt loam; common, fine, distinct, light-gray (10YR 7/1) mottles; weak, medium, subangular blocky structure; friable when moist; root zones filled with dark yellowish-brown (10YR 3/4) silt; numerous concretions of iron and manganese; numerous mica flakes; neutral; clear, smooth boundary.

IIB1b—23 to 30 inches, yellowish-brown (10YR 5/6) heavy silt loam; common, medium, distinct, pale-brown (10YR 6/3) and light-gray (10YR 7/2) mottles; moderate, medium, subangular blocky structure; friable when moist; numerous concretions of iron and manganese; numerous mica flakes; strongly acid; clear, smooth boundary.

IIB2b—30 to 53 inches +, light brownish-gray (10YR 6/2) to light-gray (10YR 7/2) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm when moist; yellowish-red (5YR 4/8) clay films on ped faces; light-gray (10YR 7/1) silt films on some ped faces; numerous concretions of iron and manganese; numerous mica flakes; very strongly acid.

The B2 horizon ranges from silt loam to silty clay loam in texture. The depth to the buried B horizon ranges from 18 to 30 inches.

Rahm silt loam (0 to 2 percent slopes) (Ra).—Included with this soil in mapping were a few small areas of moderately well drained soils and a few gently sloping areas.

If drained, this soil is suited to corn and soybeans, It is also well suited to meadow and pasture. All of these crops respond well to fertilizer. Wetness is a limitation, and flooding is a hazard. Severe damage to small grain and alfalfa are likely if flooding is prolonged. (Capability unit IIw-7; woodland group 8-A)

Sciotoville Series

The Sciotoville series consists of deep, moderately well drained, nearly level and gently sloping soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil, the lower part of which is a fragipan. These soils developed in silty old alluvium. The native vegetation consists of mixed hardwood trees. Sciotoville soils occur on terraces above the Ohio River.

The surface layer, about 9 inches thick, consists of dark-brown, friable, medium acid silt loam. The subsoil is about 51 inches thick. The upper 17 inches is yellowish-brown, friable, strongly acid and very strongly acid silt loam that has blocky structure and dark-brown and grayish-brown mottles. The lower part consists of a fragipan of strong-brown, very strongly acid heavy silt loam and silty clay loam that has prismatic structure and is mottled with light brownish gray. The underlying material is yellowish-brown, firm, very strongly acid, massive silty clay loam mottled with gray.

The organic-matter content is low. The supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Surface runoff is slow or medium. The plow layer is strongly acid unless it is limed.

A typical profile of Sciotoville silt loam, in a cultivated field at a point 2,400 feet west and 1,400 feet south of the NE. corner of sec. 7, T. 7 S., R. 1 W.

Ap—0 to 9 inches, dark-brown (10YR 4/3) silt loam; weak, fine, granular structure; friable when moist; medium acid; abrupt, smooth boundary.

B1—9 to 16 inches, yellowish-brown (10YR 5/4) silt loam; few, fine, faint, dark-brown (10YR 3/3) mottles; moderate, medium, subangular blocky structure; friable when moist; strongly acid; clear, smooth boundary.

B2t—16 to 26 inches, yellowish-brown (10YR 5/6) heavy silt loam; few, fine, faint, grayish-brown (10YR 5/2) and strong-brown (7.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable when moist; soft concretions of manganese and iron are common; very strongly acid; clear, irregular boundary.

Bx1—26 to 46 inches, strong-brown (7.5YR 5/8) heavy silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; moderate, coarse, prismatic structure; massive inside of prisms; firm when moist; moderately developed fragipan; light-gray (10YR 7/1) silt coatings and few, fine, grayish-brown (10YR 5/2) clay films on ped faces; numerous soft concretions of iron and manganese; very strongly acid; diffuse, smooth boundary.

Bx2—46 to 60 inches, strong-brown (7.5YR 5/8) silty clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; moderate, coarse, prismatic structure; massive inside of peds; firm when moist; moderately developed fragipan; grayish-brown (10YR 5/2) clay films on most ped faces; numerous soft concretions of manganese and iron; very strongly acid; diffuse, smooth boundary.

C—60 to 100 inches +, yellowish-brown (10YR 5/6) silty clay loam; common, medium, distinct, gray (10YR 6/1) mottles; massive; firm when moist; very strongly acid; deeper underlying materials usually consist of silt, silty clay loam, and sand.

The Ap horizon ranges from dark brown to yellowish brown in color. The depth to the fragipan ranges from 18 to 30 inches. The solum ranges from 50 to 80 inches in thickness. The underlying material is stratified with lenses of sand, silt, and gravel in some places.

Sciotoville silt loam, 0 to 2 percent slopes (ScA).—Included with this soil in mapping were a few small areas of gently sloping, moderately eroded soils.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because of the fragipan, which restricts roots, limits the available moisture capacity, and keeps the soil wet in spring. The suitable crops respond well to lime and fertilizer. Wetness is the main limitation. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIw–5; woodland group 9)

Sciotoville silt loam, 2 to 6 percent slopes, eroded (ScB2).—This soil occurs along drainageways and as long, narrow areas adjacent to large areas of nearly level soils. It has lost from 3 to 5 inches of the original surface layer through erosion. The present plow layer is a mixture of the rest of the surface layer and the upper part of the yellowish-brown subsoil. Included in mapping were a few small areas of severely eroded and slightly eroded soils.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because of the fragipan, which restricts roots, limits the available moisture capacity, and keeps the soil wet in spring. The suitable crops respond well to lime and fertilizer. Erosion is a hazard, and wetness and slow permeability in the fragipan are limitations. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIe–7; woodland group 9)

Stendal Series

The Stendal series consists of deep, somewhat poorly drained, nearly level soils that have a medium-textured surface layer and subsoil. These soils developed in recent mixed alluvium. The native vegetation consisted of mixed hardwood trees. Stendal soils occur on bottom lands along tributaries of the Anderson and Ohio Rivers.

The surface layer, about 8 inches thick, consists of dark grayish-brown, friable, medium acid silt loam. The subsoil, about 16 inches thick, consists of friable silt loam. The uppermost 4 inches is dark grayish-brown, strongly acid material that is mottled with yellowish brown and light brownish gray. It has platy structure. The lower part is gray, very strongly acid material that is mottled with light yellowish brown and yellowish brown. It has granular structure. The underlying material is gray, friable, very strongly acid, massive loam that is mottled with yellowish brown and light gray.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow or very slow. The plow layer is strongly acid unless it is limed.

A typical profile of Stendal silt loam, in a cultivated field at a point 2,500 feet east and 1,700 feet south of the NW. corner of sec. 20, T. 3 S., R. 3 W.

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable when moist; medium acid; abrupt, smooth boundary.

B21—8 to 12 inches, dark grayish-brown (10YR 4/2) silt loam; many, fine, distinct, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) mottles; weak, medium, platy structure; friable when moist; strongly acid; clear, wavy boundary.

B22—12 to 24 inches, gray (10YR 5/1) gritty silt loam; many, fine, distinct, light yellowish-brown (10YR 6/4) and yellowish-brown (10YR 5/4) mottles; weak, medium, granular structure; friable when moist; very strongly acid; clear, smooth boundary.

C—24 to 42 inches +, gray (10YR 5/1) loam; common, medium, distinct, yellowish-brown (10YR 5/6) and light-gray (10YR 7/1) mottles; massive; friable when moist; very strongly acid.

The Ap horizon ranges from very dark grayish brown to grayish brown. The depth to the C horizon ranges from 22 to 36 inches. The C horizon has thin lenses of fine sandy loam in some places. The depth to sandstone or shale ranges from 36 inches to more than 60 inches.

Stendal silt loam (0 to 2 percent slopes) (Sd).—This soil occurs as long, narrow areas along streams. Some of the areas are small and irregularly shaped because of the meandering of the streams. Included in mapping were a few small areas of poorly drained soils.

If drained, this soil is suited to corn and soybeans. It is also well suited to meadow and pasture. All of these crops respond well to lime and fertilizer. Wetness is a limitation, and flooding is a hazard. Severe damage to small grain and alfalfa is likely if flooding is prolonged. (Capability unit IIw–7; woodland group 13)

Strip Mines

Strip mines (St) consists of long, narrow mounds of mine spoil and a few open pits. Some of the pits contain water, and some are dry. The spoil material consists mainly of a mixture of soil, shale, sandstone, and a little coal.

The surface material generally consists of heterogeneous soil material, of large pieces of fractured shale or other rock mixed with coal fragments, or of mixtures of all of these. The spoil material ranges from very strongly acid to neutral. The mounds are nearly level or gently sloping along the top and at the base. They have strongly sloping to very steep sides. Vertical escarpments border at least one side of most pits.

These areas are suitable for trees, for wildlife habitat, and for recreational facilities. In places the spoil can be seeded to grass and legumes and used for pasture. (Capability unit VIIe–3; woodland group 16)

Terrace Escarpments

Terrace escarpments (Te) consists of moderately steep to very steep breaks associated mainly with soils of the Wheeling series. The soils are mainly deep silt loams and silty clay loams underlain at a depth of about 50 inches by stratified silty, sandy, and gravelly material. They are friable and very strongly acid. The degree to which these soils have been eroded ranges from slight to severe.

These soils are suited to trees and grass. They are not suited to cultivated crops. Some of the areas can be reclaimed and used for permanent pasture, but they are suitable for only limited grazing. A cover of permanent vegetation helps to check runoff and control erosion. Runoff and the erosion hazard are the main limitations. (Capability unit VIIe–1; woodland group 2)

Tilsit Series

The Tilsit series consists of deep, moderately well drained, nearly level and gently sloping soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil, the lower part of which is a fragipan. These soils developed in deposits of loess, 18 to 48 inches thick, over material weathered from acid sandstone, siltstone, and shale. The native vegetation consisted of mixed hardwood trees. Tilsit soils occur on ridgetops throughout the county.

The surface layer, about 12 inches thick, consists of friable silt loam. The uppermost 8 inches is dark brown and is neutral in reaction. The lower part is strong brown and medium acid. The subsoil is about 53 inches thick. The uppermost 14 inches is yellowish-brown, friable, very strongly acid silt loam and silty clay loam that has blocky structure. The lower part is a fragipan of very strongly acid silty clay loam that has prismatic structure. The upper part of the fragipan is gray mottled with strong brown, and the lower part is yellowish brown mottled with light gray. The underlying material is yellowish-brown, very firm, very strongly acid, massive, clayey shale that is mottled with gray. Sandstone bedrock is at a depth of about 90 inches.

The organic-matter content is low. The supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Surface runoff is slow or medium. The plow layer is strongly acid unless it is limed.

A typical profile of Tilsit silt loam, in an abandoned field at a point 900 feet west and 400 feet south of the NE. corner of sec. 27, T. 4 S., R. 1 W.

Ap—0 to 8 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—8 to 12 inches, strong-brown (7.5YR 5/6) silt loam; moderate, medium, granular structure; friable when moist; some material from the Ap horizon in old root zones and wormholes; medium acid; clear, smooth boundary.

B1—12 to 23 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable when moist; very strongly acid; clear, irregular boundary.

B2t—23 to 26 inches, yellowish-brown (10YR 5/6) light silty clay loam; many, medium, distinct, light-gray (10YR 7/2) mottles; moderate, medium, subangular blocky structure; friable when moist; very strongly acid; clear, irregular boundary.

Bx1—26 to 41 inches, gray (10YR 6/1) silty clay loam; many, coarse, distinct, strong-brown (7.5YR 5/8) mottles; weak, coarse, prismatic structure; massive inside of prisms; firm when moist; moderately well developed fragipan; gray (10YR 6/1) clay and silt films on most ped faces; common soft concretions of manganese and iron; very strongly acid; diffuse, smooth boundary.

IIBx2—41 to 65 inches, yellowish-brown (10YR 5/6) silty clay loam; many, medium, distinct, light-gray (10YR 7/1) mottles; weak, coarse, prismatic structure; firm when moist; moderately well developed fragipan; thin, gray (10YR 6/1) clay films on some ped faces; common soft concretions of manganese and iron; very strongly acid; abrupt, smooth boundary.

IIR1—65 to 90 inches, yellowish-brown (10YR 5/8) clayey shale; common, medium, distinct, gray (10YR 6/1) mottles; massive; very firm when moist; very strongly acid.

IIIR2—90 inches +, sandstone bedrock.

The depth to the fragipan ranges from 18 to 30 inches. The fragipan is 20 to 40 inches thick, and its texture ranges from heavy silt loam to silty clay.

Tilsit silt loam, 0 to 2 percent slopes (TIA).—This soil occurs on narrow ridgetops. It occupies areas 3 to 20 acres in size. Included in mapping were a few small tracts of Johnsburg silt loam, 0 to 2 percent slopes.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because of the fragipan, which restricts roots, limits the available moisture capacity, and keeps the soil wet early in spring. The suitable crops respond well to lime and fertilizer. Wetness early in spring is the main limitation. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIw–5; woodland group 9)

Tilsit silt loam, 2 to 6 percent slopes, eroded (TIB2).—This soil occurs along drainageways and on the sides of broad ridgetops. It has lost from 4 to 8 inches of the original surface layer through erosion. In most places the plow layer is a mixture of the rest of the surface layer and the upper part of the subsoil. Included in mapping were a few small areas of Tilsit silt loam, 0 to 2 percent slopes. Also included were a few small seepy areas.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because of the fragipan, which restricts roots, limits the available moisture capacity, and keeps the soil wet early in spring. The suitable crops respond well to lime and fertilizer. Erosion is the main hazard, and wetness early in spring is a limitation. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIe–7; woodland group 9)

Uniontown Series

The Uniontown series consists of deep, well drained and moderately well drained, gently sloping and sloping soils that have a medium-textured surface layer and a moderately fine textured subsoil. These soils developed in loess and lacustrine material. The native vegetation consisted of mixed hardwood trees. Uniontown soils occur on terraces along the margin of the Ohio River flood plain and along major tributaries of the Anderson and Ohio Rivers.

The surface layer, about 10 inches thick, consists of friable silt loam. The uppermost 7 inches is dark grayish brown and slightly acid. The lower part is yellowish brown and strongly acid. The subsoil, about 25 inches thick, consists of yellowish-brown silty clay loam that has blocky structure. The upper 15 inches is friable or firm and is medium acid. The lower part is very firm and neutral. The underlying material consists of olive-brown, firm, calcareous silty clay loam that has blocky structure and contains numerous lime concretions 1/4 to 1/2 inch in diameter.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderately slow. Surface runoff

is medium. The plow layer is strongly acid unless it is limed.

A typical profile of Uniontown silt loam, in a cultivated field at a point 1,300 feet west and 100 feet north of the SE. corner of sec. 20, T. 6 S., R. 2 W.

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) to brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable when moist; slightly acid; clear, smooth boundary.

A2—7 to 10 inches, yellowish-brown (10YR 5/4) silt loam; moderate, fine, granular structure; friable when moist; strongly acid; clear, smooth boundary.

B1t—10 to 17 inches, yellowish-brown (10YR 5/4) light silty clay loam; weak, fine, subangular blocky structure; friable when moist; few, thin, brown (10YR 5/3) clay films; medium acid; clear, wavy boundary.

B21t—17 to 25 inches, yellowish-brown (10YR 5/4 to 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm when moist; thin, brown (10YR 5/3) clay films on most ped faces; medium acid; clear, wavy boundary.

IIB22t—25 to 35 inches, yellowish-brown (10YR 5/4 to 5/6) heavy silty clay loam; moderate, medium to coarse, angular blocky structure; very firm when moist; thin, brown (10YR 5/3) clay films on most ped faces; neutral; clear, wavy boundary.

IIC—35 to 40 inches +, olive-brown (2.5YR 4/4) silty clay loam; weak, coarse, angular blocky structure to massive; firm when moist; numerous lime concretions ¼ to ½ inch in diameter; calcareous.

In places the B1t horizon is lacking. The B horizon ranges from neutral to strongly acid. The depth to the C horizon ranges from 25 to 40 inches or more. The texture of this horizon ranges from silt loam to clay.

Uniontown silt loam, 2 to 6 percent slopes, eroded (UnB2).—This soil has lost from 3 to 6 inches of the original surface layer through erosion. The plow layer is a mixture of the rest of the surface layer and the upper part of the subsoil. Included in mapping were a few small areas of slightly eroded, nearly level and gently sloping soils. Also included were a few small areas of severely eroded, gently sloping soils.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. These crops respond well to lime and fertilizer. Erosion and runoff are hazards. (Capability unit IIe-3; woodland group 1)

Uniontown silt loam, 6 to 12 percent slopes, severely eroded (UnC3).—This soil has lost 6 inches or more of the original surface layer through erosion. The present surface layer consists mostly of the upper part of the subsoil. Included in mapping were a few small areas where the surface layer is moderately fine textured. Also included were a few small areas of Uniontown silt loam, 2 to 6 percent slopes, eroded.

This soil is suited to corn and soybeans. It is especially well suited to small grain, meadow, and pasture. All of these crops respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit IVe-3; woodland group 1)

Wakeland Series

The Wakeland series consists of deep, somewhat poorly drained, nearly level soils that have a medium-textured surface layer and subsoil. These soils developed in mixed alluvium. The native vegetation consisted of mixed hardwood trees. Wakeland soils occur on bottom lands along major tributaries of the Ohio River.

The surface layer, about 9 inches thick, consists of brown or dark-brown, friable, neutral silt loam. The subsoil, about 16 inches thick, consists of light brownish-gray, friable, slightly acid and medium acid silt loam that has granular structure and is mottled with yellowish brown. The underlying material consists of pale-brown, friable, neutral, massive silt loam mottled with gray.

The organic-matter content is low. The supply of available phosphorus is low, and the supply of potassium is medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow or very slow.

A typical profile of Wakeland silt loam, in a cultivated field at a point 2,200 feet east and 2,500 feet south of the NW. corner of sec. 23, T. 3 S., R. 3 W.

Ap—0 to 9 inches, brown to dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable when moist; black (10YR 2/1) organic stains; abundant very fine roots; neutral; abrupt, smooth boundary.

B21—9 to 12 inches, light brownish-gray (10YR 6/2) to pale-brown (10YR 6/3) silt loam; common, medium, faint, yellowish-brown (10YR 5/6 to 5/8) mottles; moderate, medium, granular structure; friable when moist; many black (10YR 2/1) organic stains; abundant very fine roots; slightly acid; clear, smooth boundary.

B22—12 to 25 inches, light brownish-gray (10YR 6/2) silt loam; many, medium, distinct, yellowish-brown (10YR 5/4 to 5/8) mottles; weak, medium, granular structure; very friable when moist; a few soft, black (10YR 2/1) concretions of iron and manganese; medium acid; clear, smooth boundary.

C—25 to 40 inches +, pale-brown (10YR 6/3) silt loam; common, medium, distinct, gray (10YR 6/1) and brown (10YR 5/3) mottles; massive; friable when moist; many black (10YR 2/1) concretions of iron and manganese; neutral.

The Ap horizon ranges from dark brown to pale brown in color. The B and C horizons range from medium acid to neutral. The C horizon ranges from gray to pale brown. In some places the C horizon has thin lenses of loam, sandy loam, or sandy clay loam below a depth of about 30 inches.

Wakeland silt loam (0 to 2 percent slopes) (Wa).—This soil occurs as long, narrow areas along streams. Included in mapping were a few small areas of poorly drained soils.

If drained, this soil is suited to corn and soybeans. It is also suited to meadow and pasture. All of these crops respond well to lime and fertilizer. Severe damage to small grain and alfalfa is likely if flooding is prolonged, wetness is a limitation, and flooding is a hazard. (Capability unit IIw-7; woodland group 13)

Weinbach Series

The Weinbach series consists of deep, somewhat poorly drained, nearly level and gently sloping soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil, part of which is a fragipan. The parent material of these soils was mostly silty alluvium. The native vegetation consisted of mixed hardwood trees. Weinbach soils occur on terraces above the Ohio River.

The surface layer, which is about 15 inches thick, consists of friable silt loam. The upper 8 inches is dark grayish brown and is neutral in reaction. The lower part is brown and strongly acid. The subsoil, which is about 37 inches thick, is mainly light brownish-gray and is very strongly acid. The uppermost 8 inches consists of friable silt loam that has blocky structure and is mottled with pale brown. The middle 17 inches is the fragipan. It consists of silt loam and silty clay loam that has prismatic structure. The pan is light brownish gray and has yellowish-brown and strong-brown mottles. The lower part of the subsoil consists of firm, very strongly acid silty clay loam that has prismatic structure. The underlying material consists of dark-brown, firm, very strongly acid, massive silty clay loam.

The organic-matter content is low. The supplies of available phosphorus and potassium are low. The available moisture capacity is medium, and permeability is slow. Surface runoff is slow to medium. The plow layer is strongly acid unless it is limed.

A typical profile of Weinbach silt loam, in a cultivated field at a point 1,200 feet east and 300 feet north of the SW. corner of sec. 20, T. 6 S., R. 3 W.

Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—8 to 15 inches, brown (10YR 5/3) silt loam; few, fine, faint, light brownish-gray (10YR 6/2) mottles; moderate, coarse, granular structure; friable when moist; strongly acid; clear, smooth boundary.

B1—15 to 23 inches, light brownish-gray (10YR 6/2) silt loam; many, medium, faint, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; friable when moist; very strongly acid; abrupt, wavy boundary.

Bx1—23 to 31 inches, light brownish-gray (10YR 6/2) silt loam; common, fine, faint, yellowish-brown (10YR 5/4) mottles; strong, coarse, prismatic structure; firm when moist; moderately well developed fragipan; gray (10YR 6/1) clay films on all ped faces; few black (10YR 2/1) concretions of iron and manganese; very strongly acid; abrupt, wavy boundary.

IIBx2—31 to 40 inches, light brownish-gray (10YR 6/2) silty clay loam; many, distinct, coarse, dark-brown (10YR 4/3) mottles; strong, coarse, prismatic structure; very firm when moist; moderately well developed fragipan; thin, gray (10YR 6/1) clay films on all ped faces; few black (10YR 2/1) concretions of iron and manganese; very strongly acid; gradual, smooth boundary.

IIB3—40 to 52 inches, dark-brown (10YR 4/3) silty clay loam; moderate, coarse, prismatic structure; firm when moist; thin, brown (10YR 5/3) silt films on ped faces; thin, grayish-brown (10YR 5/2), discontinuous clay films; few black (10YR 2/1) concretions of iron and manganese, very strongly acid; diffuse, smooth boundary.

IIC—52 to 65 inches +, dark-brown (10YR 4/3) silty clay loam; massive; firm when moist; few light brownish-gray (10YR 6/2) silt films extending downward; very strongly acid.

The Ap horizon ranges from dark grayish brown to grayish brown in color. The depth to the fragipan ranges from 18 to 30 inches. The solum ranges from 45 to 60 inches in thickness. In places the C horizon has thin lenses of sand, silt, and gravel below a depth of about 60 inches.

Weinbach silt loam, 0 to 2 percent slopes (WeA)—Included with this soil in mapping were small areas of fine sandy loam or loam.

If drained, this soil is suited to corn, soybeans, and small grain. It is also well suited to meadow and pasture. It is not well suited to alfalfa, because of the fragipan, which restricts roots, impairs permeability, and limits the available moisture capacity. The suitable crops respond well to lime and fertilizer. Wetness is the main limitation. (Capability unit IIw–2; woodland group 5)

Weinbach silt loam, 2 to 4 percent slopes, eroded (WeB2).—This soil occurs along drainageways and as narrow areas along the base of slopes. It has lost from 4 to 8 inches of the original surface layer through erosion. The plow layer is a mixture of the rest of the surface layer and the upper part of the subsoil. Included in mapping were a few small areas where the slope is more than 4 percent. Also included were a few small areas of Weinbach silt loam, 0 to 2 percent slopes.

If drained, this soil is suited to corn, soybeans, and small grain. It is not suited to alfalfa, because of the fragipan, which restricts roots, impairs permeability, and limits the available moisture capacity. The suitable crops respond well to lime and fertilizer. Wetness is the main limitation. Erosion is a hazard. (Capability unit IIw–2; woodland group 5)

Wellston Series

The Wellston series consists of moderately deep and deep, well-drained, gently sloping to moderately steep soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in loess, 20 to 36 inches deep, overlying material weathered from sandstone, siltstone, and shale. The native vegetation was a mixed hardwood forest. Wellston soils occur on uplands throughout the county.

The surface layer, about 13 inches thick, consists of friable, neutral and slightly acid silt loam. The uppermost 9 inches is brown, and the lower part is yellowish brown. The subsoil, about 19 inches thick, consists of strong-brown and yellowish-brown, strongly acid silt loam and channery silt loam that has blocky structure. It is firm in the upper 13 inches and friable in the lower 6 inches. The underlying material consists of yellowish-brown, friable, very strongly acid, massive channery silt loam that has gray mottles. Sandstone and shale bedrock are at a depth of about 46 inches.

The organic-matter content is low, and natural fertility is low. The available moisture capacity is medium or high, and permeability is moderate. Surface runoff is medium or rapid. The plow layer is strongly acid unless it is limed.

A typical profile of Wellston silt loam, in a pasture at a point 1,400 feet east and 2,000 feet north of the SW. corner of sec. 35, T. 5 S., R. 3 W.

Ap—0 to 9 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; friable when moist; neutral; abrupt, smooth boundary.

A2—9 to 13 inches, yellowish-brown (10YR 5/4) silt loam; moderate, medium, granular structure; friable when moist; slightly acid; clear, smooth boundary.

B21t—13 to 26 inches, strong-brown (7.5YR 5/8) heavy silt loam; moderate, medium, subangular blocky structure; firm when moist; yellowish-red (5YR 5/8), thin, discontinuous clay films on some ped faces; strongly acid; clear, smooth boundary.

IIB22t—26 to 32 inches, yellowish-brown (10YR 5/8) channery heavy silt loam; moderate, medium, subangular blocky structure; friable when moist; yellowish-red (5YR 5/8), thin, discontinuous clay films on some ped faces; strongly acid; clear, smooth boundary.

IIC—32 to 46 inches, yellowish-brown (10YR 5/8) channery silt loam; 60 to 70 percent channery fragments; many coarse, distinct, light-gray (10YR 7/1) mottles; massive; friable when moist; very strongly acid; clear, smooth boundary. This horizon is partly weathered sandstone and shale that contains some infiltrated silt.

IIR—46 inches +, sandstone and shale bedrock.

The Ap horizon ranges from very dark gray to brown in color. The B horizon ranges from channery silt loam to silty clay loam in texture and from 18 to 36 inches in thickness. The depth to bedrock ranges from 30 to 60 inches. In places the bedrock is partly weathered or fractured to a great depth.

Wellston silt loam, 2 to 6 percent slopes, eroded (WlB2).—This soil occurs as small areas on narrow ridgetops. It has lost from 4 to 8 inches of the original surface layer through erosion. The plow layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Surface runoff is medium. Included in mapping were a few small areas of slightly eroded soils.

This soil is well suited to corn, soybeans, small grain, meadow crops, and pasture crops. These crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit IIe–3; woodland group 10)

Wellston silt loam, 2 to 6 percent slopes, severely eroded (WlB3).—This soil occurs as small areas on ridgetops. It has lost 8 inches or more of the original surface layer through erosion. In most places the upper part of the subsoil is exposed. There are small gullies in some areas. Surface runoff is medium. Included in mapping were a few small areas of moderately eroded soils.

This soil is well suited to meadow and pasture crops and also to corn, soybeans, and small grain. These crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit IIIe–3; woodland group 10)

Wellston silt loam, 6 to 12 percent slopes, eroded (WlC2).—This soil occurs along the edges of ridgetops. It has lost 4 to 8 inches of the original surface layer through erosion. The plow layer is a mixture of the rest of the surface layer and the upper part of the subsoil. Surface runoff is medium. Included in mapping were a few small areas of slightly eroded soils.

This soil is well suited to meadow and pasture crops and also to corn, soybeans, and small grain. These crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit IIIe–3; woodland group 10)

Wellston silt loam, 6 to 12 percent slopes, severely eroded (WlC3).—This soil occurs along the edges of ridgetops. It has lost 8 inches or more of the original surface layer through erosion. In most places the yellowish-brown subsoil is exposed. There are small gullies in some areas. Surface runoff is medium. Included in mapping were a few small areas of Wellston silt loam, 2 to 6 percent slopes, eroded, and of Wellston silt loam, 6 to 12 percent slopes, eroded.

This soil is well suited to meadow and permanent pasture crops. These crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit IVe–3; woodland group 10)

Wellston silt loam, 12 to 18 percent slopes (WlD).—This soil occurs on short breaks at the heads of draws and on side slopes below ridgetops. Surface runoff is medium. Included in mapping were a few small areas where the slope is more than 18 percent.

This soil is suited to small grain, meadow crops, and pasture crops. These crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit IVe–3; woodland group 10)

Wellston silt loam, 12 to 18 percent slopes, severely eroded (WlD3).—This soil occurs on short breaks at the heads of draws and on long side slopes below ridgetops. It has lost 8 inches or more of the original surface layer through erosion. In most places the yellowish-brown subsoil is exposed. There are many deep gullies, and in many of these the sandstone or shale bedrock is exposed. Surface runoff is rapid.

This soil is suited to permanent pasture. Pasture crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit VIe–1; woodland group 10)

Wellston silt loam, 18 to 25 percent slopes (WlE).—This soil occurs on long side slopes below ridgetops and on benches surrounded by steep and very steep slopes. Surface runoff is rapid. Included in mapping were a few small areas of moderately eroded soils and small areas of soils that are channery throughout and are less than 30 inches in depth over bedrock.

This soil is suited to permanent pasture. Pasture crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit VIe–1; woodland group 10)

Wellston silt loam, 18 to 25 percent slopes, severely eroded (WlE3).—This soil occurs on long side slopes below ridgetops and on benches surrounded by steep and very steep slopes. In most places the yellowish-brown subsoil is exposed. There are many deep gullies, and in many of these the bedrock is exposed. Surface runoff is rapid.

This soil is suitable for permanent pasture. Pasture crops respond well to lime and fertilizer. Erosion is the main hazard. (Capability unit VIe–1; woodland group 10)

Wellston-Gilpin-Muskingum association, 18 to 25 percent slopes (WmE).—This association occurs mainly on long slopes in the uplands. Most of the areas are between 40 acres and 100 acres in size.

Wellston silt loam, a deep and moderately deep soil, makes up about 55 percent of the association. It has a slope range of 18 to 21 percent and mainly a northerly exposure.

Gilpin silt loam, a moderately deep soil, makes up about 25 percent of the association. It developed in material weathered from sandstone, siltstone, and shale. Channery fragments occur throughout the profile, but they make up less than 20 percent of the volume.

Muskingum channery silt loam, which is moderately deep over bedrock, makes up about 10 percent of the association. It has a slope range of 21 to 25 percent. Channery fragments make up 20 to 40 percent of the subsoil.

Inclusions of other soils make up the remaining 10 percent of the association. Among the inclusions are small areas of strongly acid, shallow soils less than a foot deep over clayey shale. These areas occur as a rim around the base of slopes. In the eastern part of the

county, they extend about a quarter of the way up the slopes. Also among the inclusions are a few small areas of channery soils that are less than 20 inches deep over bedrock. At the base of slopes are small, narrow areas of deep, colluvial soils that contain large quantities of channery fragments and stones. The slope is less than 18 percent in some of the included areas, and it ranges to more than 35 percent in others. There are a few outcrops of shale and limestone throughout the association.

Runoff and the erosion hazard are the major limitations. Some areas are suitable for permanent pasture. All are suitable for trees. (Capability unit VIe-1; woodland group 12)

Wheeling Series

The Wheeling series consists of deep, well-drained, nearly level to sloping soils that have a medium-textured surface layer and a medium-textured or moderately fine textured subsoil. These soils developed in mixed alluvium. The native vegetation consisted of mixed hardwood trees. Wheeling soils occur on terraces above the Ohio River flood plain.

The surface layer, about 9 inches thick, consists of dark-brown, friable, neutral silt loam. The subsoil, about 41 inches thick, consists mostly of strong-brown, friable and firm, strongly acid silt loam and silty clay loam that has blocky structure. The lower 10 inches of the subsoil is very strongly acid and has yellow and brown mottles. The substratum consists of dark-brown, friable, very strongly acid, massive silt loam that has brown mottles.

The organic-matter content is low. The supplies of phosphorus and potassium are medium. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow or medium. The plow layer is strongly acid unless it is limed.

A typical profile of Wheeling silt loam, in a cultivated field at a point 400 feet west and 2,000 feet south of the NE. corner of sec. 30, T. 6 S., R. 3 W.

Ap—0 to 9 inches, dark-brown (10YR 3/3) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

B1—9 to 16 inches, yellowish-brown (10YR 5/8) silt loam; moderate, medium, subangular blocky structure; friable when moist; neutral; clear, smooth boundary.

B21t—16 to 32 inches, strong-brown (7.5YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; firm when moist; thin, yellowish-red (5YR 5/6) clay films on all ped faces; strongly acid; gradual, smooth boundary.

B22t—32 to 40 inches, strong-brown (7.5YR 5/8) silt loam; weak, coarse, subangular blocky structure; friable when moist; thin, yellowish-red (5YR 5/6) clay films on some ped faces; strongly acid; gradual, smooth boundary.

B3—40 to 50 inches, strong-brown (7.5YR 5/8) silt loam; common, fine, distinct, yellow (10YR 8/6) mottles and common, fine, faint, brown (10YR 5/3) mottles; weak, coarse, subangular blocky structure; friable when moist; thin, yellowish-red (5YR 5/6) clay films on some ped faces; very strongly acid; diffuse, irregular boundary.

C—50 to 60 inches +, dark-brown (10YR 4/3) silt loam; common, fine, faint, brown (10YR 5/3) mottles; massive; friable when moist; very strongly acid.

The Ap horizon is dark brown or brown. The B horizon ranges from strongly acid to extremely acid. The solum ranges from 45 to 70 inches in thickness. In places the underlying material consists of layers of silt, sand, and gravel at a depth of 45 to 70 inches or more.

Wheeling silt loam, 0 to 2 percent slopes (WnA).—Included with this soil in mapping were small areas of Sciotoville silt loam, 0 to 2 percent slopes. Also included were a few small areas of soils that have a surface layer of fine sandy loam or loam and, in addition, a few areas of fine sandy loam underlain by loamy sand at a depth of about 40 inches.

This soil is well suited to corn, soybeans, small grain, meadow, and pasture. It is very well suited to alfalfa. These crops respond well to lime and fertilizer. (Capability unit I-1; woodland group 1)

Wheeling silt loam, 2 to 6 percent slopes, eroded (WnB2).—This soil occurs along drainageways and as long, narrow strips along terrace breaks. It has lost from 3 to 6 inches of the original surface layer through erosion. In most places the plow layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Included in mapping were a few small areas of severely eroded soils and of slightly eroded soils.

This soil is well suited to corn, soybeans, small grain, meadow, and pasture. It is very well suited to alfalfa. These crops respond well to lime and fertilizer. Runoff and erosion are hazards. (Capability unit IIe-3; woodland group 1)

Wheeling silt loam, 6 to 12 percent slopes, eroded (WnC2).—This soil occurs along drainageways and as long, narrow areas along terrace breaks. It has lost from 3 to 6 inches of the original surface layer through erosion. In most places the plow layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Included in mapping were a few small areas of slightly eroded soils.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is very well suited to alfalfa. These crops respond well to lime and fertilizer. Erosion and runoff are hazards. (Capability unit IIIe-3; woodland group 1)

Wheeling silt loam, 6 to 12 percent slopes, severely eroded (WnC3).—This soil occurs on short, irregular slopes along terrace breaks and as areas at the heads of small drainageways. It has lost 6 inches or more of the original surface layer through erosion, and in most places the subsoil is exposed. Included in mapping were a few small areas of gently sloping, moderately eroded soils. There are a few small gullies.

This soil is suited to small grain, meadow, and pasture. It is well suited to alfalfa. These crops respond well to lime and fertilizer. Erosion and runoff are serious hazards. (Capability unit IVe-3; woodland group 1)

Woodmere Series

The Woodmere series consists of deep, moderately well drained and well drained, nearly level soils that have a medium-textured surface layer and a medium-textured and moderately fine textured subsoil. These soils developed in mixed alluvium. The native vegetation consisted of mixed hardwood trees. Woodmere soils occur on bottom lands along the Ohio River.

The surface layer, about 7 inches thick, consists of dark yellowish-brown, friable, neutral silt loam. The

subsoil is more than 44 inches thick. The upper 15 inches consists mostly of dark grayish-brown or brown to dark-brown, friable, neutral silt loam that has granular and blocky structure. The lower part is dark yellowish-brown and yellowish-brown, firm, slightly acid and strongly acid silty clay loam that has subangular blocky structure.

The organic-matter content is low, and natural fertility is low. The available moisture capacity is high, and permeability is moderate. Surface runoff is slow.

A typical profile of Woodmere silt loam, in a cultivated field 400 feet east and 500 feet north of the SW. corner of sec. 26, T. 7 S., R. 2 W.

Ap—0 to 7 inches, dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

B21—7 to 10 inches, dark grayish-brown (10YR 4/2) heavy silt loam; moderate, medium, granular structure; friable when moist; neutral; clear, wavy boundary.

B22—10 to 22 inches, brown to dark-brown (10YR 4/3) heavy silt loam; moderate, medium, subangular blocky structure breaking to moderate, coarse, granular; friable when moist; neutral; clear, smooth boundary.

IIB1b—22 to 27 inches, dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure breaking to moderate, coarse, granular; firm when moist; dark-brown (10YR 3/3) clay films; slightly acid; gradual, wavy boundary.

IIB2b—27 to 51 inches +, yellowish-brown (10YR 5/4) silty clay loam; common, coarse, distinct, pale-brown (10YR 6/3) mottles; weak, medium, subangular blocky structure; firm when moist; strongly acid.

The Ap horizon ranges from brown (10YR 5/3) to dark yellowish brown (10YR 4/4) in color. The texture of the buried horizons ranges from heavy silt loam to silty clay loam. The depth to the buried horizons ranges from 18 to 30 inches.

Woodmere silt loam (0 to 2 percent slopes) (Wo).—This soil occurs as long, narrow areas on the higher parts of bottom lands along the Ohio River. Included in mapping were a few small areas of gently sloping soils and a few areas of somewhat poorly drained soils.

This soil is well suited to corn, soybeans, meadow, and pasture. These crops respond well to fertilizer. Occasional flooding is a hazard. Severe damage to small grain and alfalfa is likely if flooding is prolonged. (Capability unit I-2; woodland group 8-A)

Zanesville Series

The Zanesville series consists of deep, well-drained, gently sloping to strongly sloping soils (fig. 7) that have a medium-textured surface layer and a moderately fine textured subsoil, the lower part of which is a fragipan. These soils developed in silty loess, 18 to 48 inches thick, over material weathered from acid sandstone, siltstone, and shale. The native vegetation consisted of mixed hardwood trees. Zanesville soils occur on uplands throughout the county.

The surface layer, about 10 inches thick, consists of dark-brown, friable, neutral silt loam. The subsoil is about 48 inches thick. The uppermost 21 inches is mostly strong-brown and light yellowish-brown, friable, very strongly acid silt loam that has blocky structure. The lower part consists of a fragipan of light yellowish-brown and yellowish-brown, very strongly acid silt loam and silty clay loam. The fragipan has prismatic structure and is mottled with gray and dark brown. The underlying material consists of very pale brown, friable, very strongly acid, massive stony silt loam. Sandstone bedrock begins at a depth of about 64 inches.

Figure 7.—**Profile of a Zanesville silt loam.**

The organic-matter content is low, and natural fertility is low. The available moisture capacity is medium, and permeability is slow. Surface runoff is slow to rapid. The plow layer is very strongly acid unless it is limed.

A typical profile of Zanesville silt loam, in a cultivated field at a point 1,200 feet east and 2,100 feet north of the SW. corner of sec. 35, T. 4 S., R. 2 W.

Ap—0 to 10 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable when moist; neutral; abrupt, smooth boundary.

B1—10 to 15 inches, strong-brown (7.5YR 5/6) silt loam; moderate, medium, granular structure; friable when moist; strongly acid; clear, smooth boundary.

B21t—15 to 25 inches, strong-brown (7.5YR 5/6) heavy silt loam; moderate, medium, subangular blocky structure; friable when moist; thin, dark-brown (10YR 4/4) clay films on many ped faces; very strongly acid; clear, smooth boundary.

B22t—25 to 31 inches, light yellowish-brown (10YR 6/4) silt loam; moderate, medium, subangular blocky structure; friable when moist; ped faces coated with thin, grayish-brown (10YR 5/2) silt and some discontinuous, dark yellowish-brown (10YR 4/4) clay films; very strongly acid; gradual, irregular boundary.

IIBx1—31 to 50 inches, light yellowish-brown (10YR 6/4) light silty clay loam; many, medium, distinct, gray (10YR 5/1) and dark-brown (7.5YR 4/4) mottles; moderate, coarse and very coarse, prismatic structure; upper part breaks to moderate, medium, subangular blocky and lower part is massive inside of prisms; firm when moist; moderately well developed fragipan; gray (10YR 5/1) silt coatings on most ped faces; some patchy clay films on faces of peds; very strongly acid; diffuse, wavy boundary.

IIBx2—50 to 58 inches, yellowish-brown (10YR 5/4) silt loam; weak, coarse, prismatic structure; massive inside of peds; firm when moist; moderate fragipan; many streaks of gray (10YR 5/1); coatings of gray (10YR 5/2) silt on ped faces; clay films evident on faces of some peds; very strongly acid; gradual, smooth boundary.

IIC—58 to 64 inches, very pale brown (10YR 7/4) stony silt loam (weathered siltstone, sandstone, and shale); massive; friable when moist; very strongly acid; abrupt, wavy boundary.

IIR—64 inches +, sandstone.

The Ap horizon ranges from dark grayish brown to strong brown in color. The fragipan ranges from 20 to 50 inches in thickness. The C horizon ranges from fine sandy loam to silty clay in texture. In places channery fragments make up more than half of the material immediately above the bedrock. The depth to bedrock ranges from 48 to 72 inches.

Zanesville silt loam, 2 to 6 percent slopes, eroded (ZaB2).—This soil occurs on ridgetops. It has lost from 4 to 6 inches of the original surface layer through erosion. The plow layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Surface runoff is slow. Included in mapping were a few small areas of slightly eroded and severely eroded soils.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not suited to alfalfa, because the fragipan restricts roots. The suitable crops respond well to fertilizer. Erosion is the main hazard. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIe-7; woodland group 9)

Zanesville silt loam, 2 to 6 percent slopes, severely eroded (ZaB3).—This soil occurs on ridgetops. It has lost 6 inches or more of the original surface layer through erosion. The plow layer is mostly light yellowish-brown material from the subsoil. Surface runoff is medium. Included in mapping were a few small areas of Tilsit silt loam, 2 to 6 percent slopes, eroded. There are a few small gullies.

This soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because the fragipan restricts roots. The suitable crops respond well to fertilizer. Erosion is the main hazard. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIIe-7; woodland group 9)

Figure 8.—Permanent pasture on Zanesville silt loam, 6 to 12 percent slopes, eroded.

Zanesville silt loam, 6 to 12 percent slopes, eroded (ZaC2).—This soil occurs on side slopes below ridgetops and on foot slopes. It has lost from 4 to 6 inches of the original surface layer through erosion. The plow layer is a mixture of the rest of the original surface layer and the upper part of the subsoil. Surface runoff is medium. Included in mapping were a few small areas of severely eroded soils and some of slightly eroded soils.

This soil is suited to corn, soybeans, small grain, meadow, and pasture (fig. 8). It is not well suited to alfalfa, because the fragipan restricts the roots. The suitable crops respond well to fertilizer. Erosion is the main hazard. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IIIe-7; woodland group 9)

Zanesville silt loam, 6 to 12 percent slopes, severely eroded (ZaC3).—This soil occurs on side slopes below ridgetops and on foot slopes. It has lost 6 inches or more of the original surface layer through erosion. The plow layer is mostly light yellowish-brown material from the subsoil. Surface runoff is rapid. Included in mapping were a few small areas of slightly eroded soils. There are a few small gullies.

This soil is suited to small grain, meadow, and pasture. It is not well suited to alfalfa, because the fragipan restricts the roots. Corn and soybeans can be grown occasionally, although the hazard of erosion is very severe. The suitable crops respond well to fertilizer. Erosion is the main hazard. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IVe-7; woodland group 9)

Zanesville silt loam, 12 to 18 percent slopes (ZaD).—This soil occurs below ridgetops. It is adjacent to steep and very steep areas. Surface runoff is rapid. Included in mapping were a few small areas of moderately eroded soils and a few of steep and very steep soils.

This soil is suited to small grain, meadow, and pasture. It is not well suited to alfalfa, because the fragipan restricts roots. Corn and soybeans can be grown occasionally, although the hazard of erosion is very severe. The suitable crops respond well to fertilizer. Erosion is the main hazard. Drought damage is likely in years when rainfall is below normal or is poorly distributed. (Capability unit IVe-7; woodland group 9)

Zanesville silt loam, 12 to 18 percent slopes, severely eroded (ZaD3).—This soil occurs below ridgetops. It has lost 6 inches or more of the original surface layer through erosion. The plow layer is mostly light yellowish-brown material from the subsoil. Included in mapping were a few small areas of moderately eroded soils and a few areas of steep and very steep soils.

This soil is suited to permanent pasture. Pasture plants respond well to lime and fertilizer. Erosion and runoff are the main hazards. (Capability unit VIe-1; woodland group 9)

Use and Management of the Soils

This section contains information about the use and management of the soils of Perry County for crops, engineering, woodland, and wildlife. A section on predicted yields of important crops is also given.

Use of the Soils for Crops

About a third of the acreage of Perry County is used for crops and permanent pasture. The main cultivated crops are corn, soybeans, and wheat. The principal forage crops are clover, alfalfa, and grass. A small acreage is used for orchard and vegetable crops. The results of soil tests will indicate the need for lime and fertilizer.

Capability Classification

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment when used for the common field crops and forage crops. The classification does not apply to most horticultural crops or to rice and other crops that have special requirements. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soil; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all the soils are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover. (None of the soils in this county are in Class V.)

Class VI soils have severe limitations that make them generally unsuitable for cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (None of the soils in this county are in Class VIII.)

Capability Subclasses are groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only subclasses indicated by *w*, *s*, and *c*, because the soils in it are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

Capability Units are groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-3 or IIIw-3. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit.

Management by capability units

The capability units in which the soils of Perry County have been placed are discussed in the following pages. All of the soils in one unit need about the same kind of management, respond to management in about the same way, and have essentially the same limitations.

The names of the soil series represented are mentioned in the description of each capability unit, but the listing of the series name does not necessarily indicate that all the soils of a series are in the same capability unit. To find the capability classification of any given soil, refer to the Guide to Mapping Units.

CAPABILITY UNIT I-1

This unit consists of deep, well drained and moderately well drained soils of the Elkinsville, Pekin, and Wheeling series. These soils are on terraces along the Ohio River and its major tributaries. They are nearly level.

The organic-matter content of these soils is low, and natural fertility is low. The plow layer is strongly acid unless it is limed. The Elkinsville and Wheeling soils have high available moisture capacity and moderate permeability. The Pekin soil, which has a fragipan in the subsoil, has medium available moisture capacity and slow permeability.

These soils are well suited to corn, soybeans, wheat, alfalfa, and grass. These crops respond well to lime and fertilizer. The Pekin soil is not well suited to alfalfa, because the fragipan restricts the roots. Other crops grown on the Pekin soil are subject to drought damage in years when rainfall is below normal or is poorly distributed.

CAPABILITY UNIT I-2

This unit consists of deep, well drained and moderately well drained soils of the Cuba, Haymond, Huntington, Lindside, Philo, and Woodmere series. These soils are on bottom lands along the Ohio River and its major tributaries. They are nearly level.

The organic-matter content of these soils is low, and natural fertility is low or medium. The available moisture capacity is high, and permeability is moderate. The plow layer is slightly acid or neutral.

Maintenance of the organic-matter content and of fertility are the main management problems. From December to June, flooding is a hazard.

These soils are well suited to corn, soybeans, clover, and grass. These crops respond well to fertilizer. Alfalfa and fall-planted small grain are subject to severe damage if flooding is prolonged.

CAPABILITY UNIT IIe-3

This unit consists mainly of deep, well-drained, medium-textured, moderately eroded soils of the Alford, Crider, Elkinsville, Princeton, Uniontown, Wellston, and Wheeling series. These soils are on terraces and bottom lands along the Ohio River and its tributaries, and on ridgetops in the uplands. They are nearly level to gently sloping.

The organic-matter content of these soils is low, and natural fertility is low. In most of the soils the available moisture capacity is high, and permeability is moderate. The plow layer is strongly acid unless it is limed.

Figure 9.—**Grassed waterway on Zanesville silt loam, 2 to 6 percent slopes, eroded.**

Some areas of the Wellston soil are moderately deep, and in these places the available moisture capacity is medium. The Uniontown soil is moderately slowly permeable, and part of it is only moderately well drained. The Princeton soil has a moderately coarse textured surface layer and medium available moisture capacity.

The hazard of further erosion is the main limitation in the use and management of these soils. The low content of organic matter and the low fertility are other limitations. The Princeton soil and the moderately deep areas of the Wellston soil are somewhat droughty in years when rainfall is below normal or is poorly distributed.

These soils are suited to corn, soybeans, wheat, alfalfa, and grass. The Alford and Crider soils can be used for orchard crops.

Minimum tillage, contour farming, and diversion terraces help to control erosion. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IIe-7

This unit consists mainly of deep, moderately well drained, medium-textured soils of the Pekin, Sciotoville, Tilsit, and Zanesville series. These soils are on terraces along major tributaries of the Ohio River and on ridgetops. They are gently sloping and moderately eroded.

The organic-matter content of these soils is low, and natural fertility is low. The available moisture capacity is medium, and permeability is slow. The plow layer is strongly acid or very strongly acid unless it is limed. The subsoil has a fragipan, which restricts the penetration of roots and water.

The hazard of further erosion is the main limitation in the use and management of these soils. The low content of organic matter and the low natural fertility are other limitations. Wetness usually causes prolonged delays in spring planting, but the Zanesville soil is well drained and can be plowed early in spring. The soils are somewhat droughty in years when rainfall is below normal or is poorly distributed. The lack of moisture occasionally results in damage to crops.

These soils are suited to corn, soybeans, wheat, clover, and grass. They are not well suited to alfalfa, because they have a fragipan and because they are usually wet early in spring.

Minimum tillage, contour cultivation, grassed waterways (fig. 9), and diversion terraces help to control erosion. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IIw-1

This unit consists of Patton silty clay loam, a deep, very poorly drained soil on terraces along the margin of the flood plain of the Ohio River, and in lower valleys along its tributaries. This soil is nearly level.

The organic-matter content of this soil is high, and natural fertility is medium or high. The available moisture capacity is high, and permeability is slow. The plow layer is slightly acid or neutral.

Wetness is the main limitation, and maintenance of tilth is a problem in the use and management of this

soil. Large clods are likely to form if the soil is tilled when too wet or too dry. These clods are often difficult to break up.

If drained, this soil is suited to corn, soybeans, small grain, meadow, and pasture. It is not well suited to alfalfa, because of prolonged wetness and a high frost-heave potential.

Minimum tillage, utilization of crop residue, and working the soil when the moisture content is favorable are ways to maintain good tilth. Crops respond well to fertilizer.

CAPABILITY UNIT IIw-2

This unit consists of deep, somewhat poorly drained, medium-textured soils of the Bartle, Henshaw, and Weinbach series. These soils are on terraces and alluvial fans along the Ohio River and its tributaries. They are nearly level and gently sloping.

The organic-matter content of these soils is low, and natural fertility is low. In most of these soils the available moisture capacity is medium, and permeability is slow. The plow layer is strongly acid unless it is limed.

The Bartle and Weinbach soils have a fragipan in the subsoil, which restricts the penetration of roots and water. The Henshaw soils lack a fragipan and have high available moisture capacity. The gently sloping Henshaw and Weinbach soils are moderately eroded, and further erosion is a hazard.

Wetness is the main limitation in the use and management of these soils. The low organic-matter content and low fertility are other limitations.

If drained, these soils are suited to corn, soybeans, small grain, meadow, and pasture. The Henshaw soils are suited to alfalfa, but the Bartle and Weinbach soils are not, because of prolonged wetness and because the fragipan restricts roots.

Minimum tillage and contour cultivation are ways to check erosion on the gently sloping Henshaw and Weinbach soils.

CAPABILITY UNIT IIw-5

This unit consists of deep, moderately well drained, medium-textured soils of the Sciotoville and Tilsit series. These soils are on terraces near the Ohio River and on ridgetops throughout the county. They are nearly level.

The organic-matter content of these soils is low, and natural fertility is low. The available moisture capacity is medium, and permeability is slow. The plow layer is strongly acid unless it is limed. A fragipan in the subsoil restricts the penetration of roots and water.

Wetness early in spring and slow permeability in the fragipan are limitations. The low content of organic matter and the low fertility are other limitations. These soils are somewhat droughty in years when rainfall is below normal or is poorly distributed, and the lack of moisture occasionally results in damage to crops.

These soils are suited to corn, soybeans, wheat, clover, and grass. They are not well suited to alfalfa, because they have a fragipan and because they are usually wet early in spring.

If drained, these soils can be worked earlier in spring. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IIw-7

This unit consists of deep, somewhat poorly drained, medium-textured soils of the Newark, Rahm, Stendal, and Wakeland series. These soils are on bottom lands along the Ohio River and its tributaries. They are nearly level.

The organic-matter content of these soils is low, and natural fertility is medium. The available moisture capacity is high, and permeability is moderate or moderately slow. Except for the Stendal soil, the plow layer is naturally slightly acid to neutral. The plow layer of the Stendal soil is strongly acid unless it is limed.

Wetness is the main limitation in the use and management of these soils. The low content of organic matter is another limitation. Flooding and consequent sedimentation are hazards in spring.

If drained, these soils are well suited to corn, soybeans, meadow, and pasture. Small grain and alfalfa are subject to severe damage if flooding is prolonged. Crops respond well to fertilizer. Delaying planting until after the flood hazard is past helps to avoid damage or loss of crops from flooding.

CAPABILITY UNIT IIs-8

This unit consists of Bruno fine sandy loam, a deep, well-drained soil on bottom lands along the Ohio River. This soil is nearly level.

The organic-matter content of this soil is low, and fertility is low. The available moisture capacity is medium, and permeability is moderately rapid.

Droughtiness is the main limitation in the use and management of this soil. The low content of organic matter and the low fertility are other limitations. Flooding is a hazard late in winter and early in spring; soil from upland areas is often deposited on this soil by floodwaters.

This soil is suited to corn and soybeans. Alfalfa and small grain are subject to severe damage if flooding is prolonged. Delaying planting until after the flood hazard is past helps to avoid damage or loss of crops from flooding. Crops are seriously damaged by drought in years when rainfall is below normal or is poorly distributed. The use of crop residue and green-manure crops helps to maintain the organic-matter content and improve the available moisture capacity. Crops respond well to fertilizer.

CAPABILITY UNIT IIIe-3

This unit consists of deep and moderately deep, well-drained, medium-textured soils of the Alford, Wellston, and Wheeling series. These soils are on gently sloping and sloping uplands throughout the county and on sloping terraces along the Ohio River.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is generally high, but it is medium in moderately deep areas of Wellston soils. Permeability is moderate. The plow layer is strongly acid unless it is limed. The gently sloping soil is severely eroded, and the sloping soils are moderately eroded.

The hazard of further erosion is the main limitation in the use and management of these soils. The low content of organic matter and the low fertility are other limitations.

These soils are suited to corn, soybeans, small grain, and grass. The Alford soil is suitable for orchard crops. The Wellston soils are suitable for farm ponds (fig. 10).

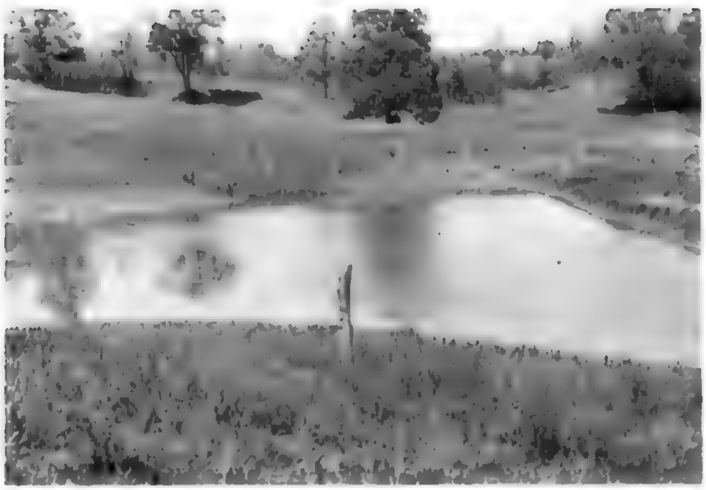

Figure 10.—**Farm pond on Wellston silt loam, 6 to 12 percent slopes, eroded, which is in capability unit IIIe–3.**

Minimum tillage, contour farming, stripcropping, diversion terraces, and winter cover crops help to check runoff and control erosion. Grassed waterways are also helpful. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IIIe–7

This unit consists of deep, well-drained, medium-textured, moderately and severely eroded soils of the Zanesville series. These soils are on ridgetops and foot slopes in the uplands. They are gently sloping and sloping.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is medium. A slowly permeable fragipan at a depth of about 24 inches restricts the penetration of roots and water. The plow layer is very strongly acid unless it is limed.

The hazard of further erosion is the main limitation in the use and management of these soils. Crops are subject to drought damage in years when rainfall is below normal or is poorly distributed.

These soils are suited to corn, soybeans, small grain, meadow, and pasture. Deep-rooted crops are not suited, because the fragipan restricts the penetration of roots.

Minimum tillage, contour farming, stripcropping, diversion terraces, and winter cover crops help to check runoff and control erosion. Grassed waterways are also helpful. The use of crop residue and green-manure crops helps to maintain organic-matter content and fertility and improve tilth. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IIIw–3

This unit consists mainly of deep, somewhat poorly drained, medium-textured soils of the Ginat, Johnsburg, and McGary series. These soils are on bottom lands along major rivers and creeks, on terraces along the Ohio River, and on broad ridgetops. They are nearly level and gently sloping.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is medium, and permeability is slow. Most of the soils have a fragipan, which restricts the penetration of roots and water. The plow layer is strongly acid unless it is limed.

The gently sloping areas of Johnsburg soils are moderately eroded, and further erosion is a hazard. The McGary soil lacks a fragipan but is very slowly permeable. It has a high available moisture capacity, and in most places the plow layer is medium acid or slightly acid unless it is limed. The Ginat soil is poorly drained.

Wetness is the main limitation in the use and management of these soils. The low content of organic matter and the low fertility are other limitations.

If drained (fig. 11), these soils are suited to corn, soybeans, small grain, clover, and grass. The Ginat soil is not well suited to small grain. Neither the Ginat nor the McGary soil is well suited to alfalfa, because they are excessively wet in winter and early in spring.

Minimum tillage, diversion terraces, contour farming, stripcropping, winter cover crops, and grassed waterways help to control erosion on the gently sloping areas of Johnsburg soils. Crops respond well to fertilizer.

Figure 11.—**Open-ditch drainage on Ginat silt loam (0 to 2 percent slopes), which is in capability unit IIIw–3.**

CAPABILITY UNIT IIIw–11

This unit consists of Pope loam, channery subsoil variant, a deep, well-drained, nearly level soil on bottom lands along streams. This soil is underlain by channery sandy loam, sand, and gravel at a depth of 10 to 24 inches.

The organic-matter content of this soil is low, and fertility is low. The available moisture capacity is low, and permeability is moderately rapid. The plow layer is strongly acid unless it is limed.

Flooding in winter and spring is the main hazard in the use and management of this soil. Wetness early in spring and droughtiness in mid or late summer are other limitations.

This soil is suited to corn, soybeans, meadow, and pasture. It is not well suited to small grain and alfalfa, because of wetness and the hazard of flooding. Delaying planting until after the flood hazard is past helps to avoid damage or loss of crops from flooding. Crops are subject to drought damage in years when rainfall is below normal or is poorly distributed.

The use of crop residue and green-manure crops helps to maintain the organic-matter content and improve fertility. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IVe-3

This unit consists of deep, well-drained, mainly medium-textured soils of the Alford, Crider, Elkinsville, Uniontown, Wellston, and Wheeling series. These soils are on terraces along the Ohio River and its tributaries and on uplands throughout the county. They are sloping and strongly sloping. Most of them are severely eroded, but some are moderately eroded or only slightly eroded.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is high, and permeability is moderate. The plow layer is strongly acid unless it is limed.

The surface layer of the severely eroded Crider soil is moderately fine textured, and clods form if this soil is cultivated when too wet or too dry. In places the Uniontown soil is moderately well drained. Some areas of the Wellston soils are moderately deep, and in these places the available moisture capacity is medium.

The hazard of further erosion is the main limitation in the use and management of these soils. The low content of organic matter and the low fertility are other limitations. Maintenance of good tilth is a problem on the moderately fine textured Crider soil. The moderately deep Wellston soils are somewhat droughty in mid or late summer in years when rainfall is below normal or is poorly distributed.

These soils are suited to small grain, alfalfa, and grass. Corn and soybeans can be grown occasionally, but the hazard of erosion is very severe. The Alford and Crider soils can be used for orchards.

Minimum tillage, contour farming, stripcropping, and diversion terraces help to check runoff and control erosion. Grassed waterways are also helpful. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT IVe-7

This unit consists of deep, well-drained, medium-textured soils of the Zanesville series. These soils are on side slopes below ridgetops and on foot slopes on uplands. They are sloping and strongly sloping.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is medium. A slowly permeable fragipan begins at a depth of about 24 inches. The plow layer is very strongly acid unless it is limed. These soils are slightly to severely eroded.

The hazard of further erosion is the main limitation in the use and management of these soils. Drought damage is likely in years when rainfall is below normal or is poorly distributed.

These soils are suited to small grain, meadow, and pasture. Corn and soybeans can be grown occasionally, but the hazard of erosion is very severe. Deep-rooted crops are not well suited, because the fragipan restricts the penetration of roots and water.

Minimum tillage, contour farming, diversion terraces, winter cover crops, and stripcropping help to check runoff and control erosion. Grassed waterways are also helpful. Crop residue and green-manure crops can be used to maintain organic-matter content and fertility. The acidity of the plow layer can be counteracted by applying lime. Crops respond well to fertilizer.

CAPABILITY UNIT VIe-1

This unit consists of moderately deep and deep, moderately well drained and well drained, medium-textured and moderately fine textured soils of the Alford, Crider, Gilpin, Markland, Muskingum, Princeton, Wellston, and Zanesville series. These soils are on uplands and terraces throughout the county. They are sloping to very steep. Most of them are severely eroded, and the rest are slightly or moderately eroded.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is medium to high, and permeability is slow to moderate. The surface layer of most of the soils is strongly acid or very strongly acid unless it is limed. The surface layer of the Markland soils is neutral or slightly acid.

The hazard of further erosion is the main limitation in the use and management of these soils.

These soils are suited to permanent pasture. A permanent cover of vegetation helps to check runoff and control erosion. Contour plowing and minimum tillage in preparation of seedbeds for pasture are also helpful. The strongly sloping areas of Alford and Crider soils can be used for orchard crops if a cover of permanent vegetation is maintained. Pasture crops, orchard crops, and orchard cover crops respond well to lime and fertilizer.

CAPABILITY UNIT VIIe-1

This unit consists of deep and moderately deep, well-drained, medium-textured and moderately fine textured soils of the Gilpin, Markland, and Muskingum series, and of Terrace escarpments. The soils in this unit occur as long, narrow areas along drainageways. Terrace escarpments occur as short breaks along the edge of terraces. The areas are moderately steep to very steep.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is high, and permeability is moderate to slow. The soils are slightly to severely eroded.

Runoff and further erosion are severe hazards in the use and management of these soils.

The soils in this unit are suited to trees. They are not suited to cultivated crops. Some of the areas can be renovated and planted to permanent pasture. Permanent vegetation helps to check runoff and control erosion.

CAPABILITY UNIT VIIe-2

This unit consists of shallow and moderately deep, well-drained, stony, medium-textured soils of the Corydon series. These soils occur on uplands throughout the county. They are moderately steep to very steep.

The organic-matter content of these soils is low, and fertility is low. The available moisture capacity is low or medium, and permeability is moderate or moderately slow. Surface runoff is medium to very rapid.

The hazard of further erosion is the main limitation in the use and management of these soils.

These soils are not suited to cultivated crops, but they are suited to trees. Well-established native grasses grow well in areas where the tree canopy is fairly thin. Such areas are suitable for limited grazing.

Maintaining a permanent cover of trees or grass helps to check runoff and control erosion. Areas that are suitable for grazing must not be overgrazed.

CAPABILITY UNIT VIIe–3

This unit consists only of Strip mines. The spoil in this land type is a heterogeneous mixture of soil material, large pieces of fractured rock and shale, fragments of coal, or combinations of these materials. The areas occur mainly as long, narrow mounds, but also as open pits, some of which contain water. The mounds are nearly level or gently sloping on the top and at the base. They are strongly sloping to very steep on the sides. Vertical escarpments border at least one side of most pits. Reaction of the spoil ranges from very strongly acid to neutral.

This land type is suited to production of timber, to wildlife habitats, or to recreation areas. In places the spoil can be seeded to grass and legumes and used for pasture.

CAPABILITY UNIT VIIe–4

This unit consists only of Gullied land. The soil material in this land type is underlain by bedrock at a depth of 4 to 6 feet. In many places bedrock is exposed at the bottom of the gullies.

The organic-matter content is very low, and fertility is very low. The erosion hazard is severe. Most of the areas are presently bare of vegetation, but shrubs, weeds, and native grasses are starting to grow in places. Gullied land is suited to grasses, trees, and shrubs, all of which help to stabilize the soil material, control runoff, and provide cover for wildlife. Many of the ridges between gullies are suited to Christmas trees.

Predicted Yields

Table 2 shows for each soil the average yields per acre of the principal crops, under two levels of management.

TABLE 2.—*Predicted yields per acre*

[Yields in columns A can be expected under an average level of management; those in columns B can be expected under a high level of management. Dashed lines indicate that the crop is either not grown or is not suited to the soil specified. Gullied land, Strip mines, and Terrace escarpments are omitted from this table]

Soil	Corn		Wheat		Oats		Soybeans		Clover-grass hay		Alfalfa-grass hay	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*
Alford silt loam, 2 to 6 percent slopes, eroded	65	90	32	40	50	65	25	35	2.0	3.0	3.0	4.0
Alford silt loam, 6 to 12 percent slopes, eroded	55	80	28	35	45	60	20	30	1.5	2.5	2.5	4.0
Alford silt loam, 6 to 12 percent slopes, severely eroded	50	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Alford silt loam, 12 to 18 percent slopes	55	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Alford silt loam, 12 to 18 percent slopes, severely eroded	------	------	------	------	------	------	------	------	1.3	2.2	2.0	3.0
Alford silt loam, 18 to 25 percent slopes, severely eroded	------	------	------	------	------	------	------	------	1.3	2.2	2.0	3.0
Bartle silt loam, 0 to 3 percent slopes	80	100	35	45	55	75	30	40	2.0	3.0	3.0	5.0
Bruno fine sandy loam	70	100	32	40	30	45	25	35	2.0	3.0	2.5	4.0
Corydon stony silt loam, 18 to 25 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------
Corydon stony silt loam, 25 to 70 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------
Crider silt loam, 2 to 6 percent slopes, eroded	65	90	32	40	50	65	25	35	2.0	3.0	3.0	4.0
Crider silt loam, 12 to 18 percent slopes, eroded	55	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Crider silty clay loam, 6 to 12 percent slopes, severely eroded	55	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Crider silty clay loam, 12 to 18 percent slopes, severely eroded	------	------	------	------	------	------	------	------	1.3	2.2	2.0	3.0
Cuba silt loam	70	100	32	40	45	60	25	35	2.0	3.0	2.5	4.0
Elkinsville silt loam, 0 to 2 percent slopes	75	105	37	45	60	80	30	40	2.5	3.0	3.5	5.0
Elkinsville silt loam, 2 to 6 percent slopes, eroded	65	90	32	40	50	65	25	35	2.0	3.0	3.0	4.0
Elkinsville silt loam, 6 to 12 percent slopes, severely eroded	55	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Gilpin-Wellston-Muskingum association, 25 to 35 percent slopes	------	------	------	------	------	------	------	------	------	------	------	------
Ginat silt loam	60	90	------	------	------	------	20	30	1.5	2.0	------	------
Haymond silt oam	70	100	32	40	45	60	25	35	2.0	3.0	2.5	4.0
Henshaw silt loam, 0 to 2 percent slopes	80	100	35	45	55	75	30	40	2.0	3.0	3.0	5.0
Henshaw silt loam, 2 to 6 percent slopes, eroded	80	100	35	45	55	75	30	40	2.0	3.0	3.0	5.0
Huntington silt loam	70	100	32	40	45	60	25	35	2.0	3.0	2.5	4.0
Johnsburg silt loam, 0 to 2 percent slopes	65	80	28	35	45	65	24	28	2.0	3.0	------	------
Johnsburg silt loam, 2 to 6 percent slopes, eroded	65	80	28	35	45	65	24	28	2.0	3.0	------	------
Lindside silt loam	70	100	32	40	35	50	25	35	2.0	3.0	2.5	4.0

TABLE 2.—*Predicted yields per acre*—Continued

Soil	Corn		Wheat		Oats		Soybeans		Clover-grass hay		Alfalfa-grass hay	
	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Tons*	*Tons*
Markland silt loam, 12 to 18 percent slopes, eroded	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Markland silt loam, 18 to 25 percent slopes, eroded	—	—	—	—	—	—	—	—	1.3	2.3	2.0	3.0
Markland silty clay loam, 6 to 12 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Markland silty clay loam, 12 to 18 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.3	2.0	3.0
Markland silty clay loam, 18 to 25 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.3	2.0	3.0
Markland silty clay loam, 25 to 35 percent slopes, severely eroded	—	—	—	—	—	—	—	—	—	—	—	—
McGary silt loam	50	70	28	35	45	65	24	28	2.0	3.0	—	—
Muskingum-Gilpin association, 35 to 70 percent slopes	—	—	—	—	—	—	—	—	—	—	—	—
Newark silt loam	70	90	15	25	30	45	25	35	1.5	2.5	2.0	2.5
Patton silty clay loam	80	110	35	45	60	80	30	40	2.0	3.0	3.0	5.0
Pekin silt loam, 0 to 2 percent slopes	75	105	37	45	60	80	30	40	2.5	3.0	3.5	5.0
Pekin silt loam, 2 to 6 percent slopes, eroded	70	95	35	45	55	75	28	38	2.0	3.0	3.0	4.5
Philo silt loam	70	100	32	40	30	50	25	35	2.0	3.0	2.5	4.0
Pope loam, channery subsoil variant	80	100	—	—	—	—	25	40	—	—	—	—
Princeton fine sandy loam, 2 to 6 percent slopes, eroded	60	80	25	35	50	60	25	35	2.0	3.0	3.0	4.0
Princeton loam, 12 to 25 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Rahm silt loam	70	90	15	25	30	45	25	35	1.5	2.5	2.0	2.5
Sciotoville silt loam, 0 to 2 percent slopes	55	75	30	40	35	50	22	28	2.0	3.0	2.5	3.0
Sciotoville silt loam, 2 to 6 percent slopes, eroded	50	75	23	32	30	40	20	25	2.0	2.5	2.5	3.5
Stendal silt loam	70	90	15	25	30	45	25	35	1.5	2.5	2.0	2.5
Tilsit silt loam, 0 to 2 percent slopes	55	75	30	40	35	50	22	28	2.0	3.0	2.5	3.0
Tilsit silt loam, 2 to 6 percent slopes, eroded	50	75	23	32	30	40	20	25	2.0	2.5	2.5	3.5
Uniontown silt loam, 2 to 6 percent slopes, eroded	65	90	32	40	50	65	25	35	2.0	3.0	3.0	4.0
Uniontown silt loam, 6 to 12 percent slopes, severely eroded	55	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Wakeland silt loam	70	90	15	25	30	45	25	35	1.5	2.5	2.0	2.5
Weinbach silt loam, 0 to 2 percent slopes	60	85	30	40	45	60	20	30	2.0	3.0	2.0	3.0
Weinbach silt loam, 2 to 4 percent slopes, eroded	60	85	30	40	45	60	20	30	2.0	3.0	2.0	3.0
Wellston silt loam, 2 to 6 percent slopes, eroded	65	90	32	40	50	65	25	35	2.0	3.0	3.0	4.0
Wellston silt loam, 2 to 6 percent slopes, severely eroded	50	80	28	35	35	60	20	30	1.5	2.5	2.5	4.0
Wellston silt loam, 6 to 12 percent slopes, eroded	55	80	28	35	35	60	20	30	1.5	2.5	2.5	4.0
Wellston silt loam, 6 to 12 percent slopes, severely eroded	50	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Wellston silt loam, 12 to 18 percent slopes	55	75	25	35	35	50	20	30	1.5	2.5	2.5	3.0
Wellston silt loam, 12 to 18 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Wellston silt loam, 18 to 25 percent slopes	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Wellston silt loam, 18 to 25 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Wellston-Gilpin-Muskingum association, 18 to 25 percent slopes	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0
Wheeling silt loam, 0 to 2 percent slopes	75	105	37	45	60	80	30	40	2.5	3.0	3.5	5.0
Wheeling silt loam, 2 to 6 percent slopes, eroded	65	90	32	40	50	65	25	35	2.0	3.0	3.0	4.0
Wheeling silt loam, 6 to 12 percent slopes, eroded	60	85	30	40	50	65	25	35	2.0	3.0	3.0	4.0
Wheeling silt loam, 6 to 12 percent slopes, severely eroded	50	80	28	35	45	60	20	30	1.5	2.5	2.5	4.0
Woodmere silt loam	70	100	32	40	45	60	25	35	2.0	3.0	2.5	4.0
Zanesville silt loam, 2 to 6 percent slopes, eroded	55	80	23	32	40	55	20	28	2.0	2.5	2.5	3.5
Zanesville silt loam, 2 to 6 percent slopes, severely eroded	50	75	20	30	30	40	20	25	1.3	2.0	2.3	3.5
Zanesville silt loam, 6 to 12 percent slopes, eroded	55	80	20	30	40	55	20	28	1.3	2.0	2.3	3.5
Zanesville silt loam, 6 to 12 percent slopes, severely eroded	40	60	20	30	35	55	15	25	1.3	2.0	2.0	3.0
Zanesville silt loam, 12 to 18 percent slopes	40	60	20	30	35	55	15	25	1.3	2.0	2.0	3.0
Zanesville silt loam, 12 to 18 percent slopes, severely eroded	—	—	—	—	—	—	—	—	1.3	2.2	2.0	3.0

The figures in columns A represent yields that can be expected under an average or medium level of management. Those in columns B represent yields that can be expected under an improved or high level of management.

The following are assumed to be part of an average management system:

1. Using cropping systems that maintain tilth and organic-matter content.
2. Following management practices that control erosion sufficiently to prevent serious reduction in the quality of the soil.
3. Applying fertilizer and lime in moderate amounts if need is indicated by soil tests.
4. Returning most of the crop residue to the soil.
5. Using conventional plowing and tillage methods.
6. Using crop varieties that are generally adapted to the climate and the soils.
7. Controlling weeds fairly well by tillage and spraying.
8. Draining wet areas enough for cropping but not always enough to prevent lower yields.

The following are assumed to be part of a high-level management system:

1. Using cropping systems that maintain tilth and organic-matter content.
2. Controlling erosion to the maximum extent feasible, so that the quality of the soil is maintained or improved rather than reduced.
3. Maintaining a high level of fertility by means of frequent soil tests and use of fertilizer in accordance with recommendations of the State Agricultural Experiment Station.
4. Liming the soils in accordance with the results of soil tests.
5. Using crop residue to the fullest extent practicable to protect and improve the soil.
6. Following minimum tillage practices where needed because of the soil hazards of compaction and erosion.
7. Using only the crop varieties that are best adapted to the climate and the soil.
8. Controlling weeds carefully by tillage and spraying.
9. Draining wet areas well enough so that wetness does not restrict yields of adapted crops.

The yields shown in table 2 are estimated averages for a period of 5 to 10 years. They are based on farm records, on interviews with farmers and members of the staff of the Purdue Agricultural Experiment Station, and on direct observations by soil scientists and soil conservationists. Considered in making the estimates were the prevailing climate, the characteristics of the soils, and the influence of different kinds of management on the soils.

It should be understood that these yield figures are not intended to apply directly to specific tracts of land for any particular year, because the soils vary somewhat from place to place, management practices differ from farm to farm, and weather conditions vary from year to year. Nevertheless, these estimates appear to be as accurate a guide as can be obtained without detailed and lengthy investigation. They are useful in showing the relative productivity of the soils and how soils respond to different levels of management.

Woodland [1]

Hardwood forest covered all of Perry County before settlers began clearing the land for farming. Nearly half of the acreage is now used for cultivated crops. In 1959 about 130,873 acres was woodland. Much of the present forest cover is on moderately steep to very steep slopes in upland areas.

The soils vary widely in their suitability for trees. Some of the soil features that significantly affect productivity for trees, and thus affect site index, are available moisture capacity, effective rooting depth, thickness of the surface layer, natural supply of plant nutrients, texture, consistence, aeration, and depth to the water table.

Forest types

Upland oak, tulip-poplar, pin oak, and sweetgum are the principal forest types in Perry County.

The upland oak type is dominant on well-drained sites. The major species in this forest type are white oak, red oak, black oak, chinquapin oak, hickory, white ash, sugar maple, and tulip-poplar.

The tulip-poplar type is dominant on the lower part of steep slopes, on cool north and northeast slopes, and in coves. Tulip-poplar is dominant. Other species in this forest type are white ash, red oak, basswood, white oak, hickory, beech, black walnut, and sugar maple.

The pin oak type grows on the poorly drained upland, terrace, and bottom-land soils of the county. Other species in this forest type are soft maple, sweetgum, swamp white oak, elm, and ash.

The sweetgum type is the major forest type on poorly drained upland and terrace soils and on poorly drained and somewhat poorly drained bottom-land soils. Other species in this forest type are soft maple, red river birch, hickory, ash, and sycamore.

Woodland groups

The soils of Perry County have been placed in woodland groups. Each group is made up of soils that are about the same in potential productivity, use suitability, and management needs. The groups are listed in table 3, the soils in each group are identified by their map symbols, and the site index and some of the basic facts needed in planning woodland management are given for each group. The woodland group classification of any individual soil can be found by referring to the Guide to Mapping Units.

Site index is the height attained by the dominant trees in a stand at the age of 50 years. For upland oaks, site index is based on growth data given in USDA Technical Bulletin No. 560 (*6*).[2] For tulip-poplar, it is based on unpublished field studies.[3] For pin oak, it is based on

[1] By JOHN O. HOLWAGER, woodland conservationist, Soil Conservation Service.

[2] Italicized numbers in parentheses refer to Literature Cited, page 69.

[3] The ratings for tulip-poplar are based on 1957 data assembled by W. T. DOOLITTLE, Forest Service.

growth data for sweetgum given in the Forestry Handbook published in 1955 by the Society of American Foresters (*8*). Site index can be converted to growth and yield data by referring to yield tables and other data developed by the Soil Conservation Service (*5*, *6*).

Seedling mortality refers to the expected loss of natural seedlings or planted stock. It is rated as slight if natural regeneration is ordinarily adequate, as moderate if natural regeneration cannot always be relied upon for restocking within a reasonable length of time, and as severe if establishment of a satisfactory stand requires considerable replanting, special preparation of the seedbed, and superior planting techniques.

The erosion hazard refers to the risk of erosion when the soils are managed for production of woodland crops. The rating is slight if problems of erosion control are unimportant. It is moderate if some attention must be given to prevention of unnecessary soil erosion.

The windthrow hazard depends on soil characteristics that control development of tree roots and affect windfirmness. The rating is slight if there is no special problem and individual trees can be expected to remain standing if released on all sides. It is moderate if root development is adequate for stability except during high winds or when the soils are excessively wet. The hazard is severe if trees are not stable enough to remain standing if released on all sides.

The ratings of equipment limitations take into account the soil characteristics that restrict or prevent the use of equipment commonly used in tending and harvesting woodland crops. The rating is slight if there is no restriction on the kind of equipment that can be used or on the time of year that equipment can be used. It is moderate if there is a seasonal restriction of less than 3 months, or if there are moderate restrictions because of slope, wetness, stones, or other physical characteristics. The rating is severe if there is a seasonal period of more than 3 months when equipment cannot be used, or if there are other severe restrictions caused by steepness, wetness, stoniness, or numerous gullies.

The trees listed as the most desirable in natural stands are those that have the most rapid growth rate combined with the highest value and marketability. Trees suitable for planting are listed in priority of preference. This list gives only those considered most important.

Wildlife [4]

A well-planned and well-managed system of farming maintains the productivity of the soils and provides food and cover for wildlife. Farming that depletes the soils reduces food and cover for wildlife and thus reduces the potential population of desirable species of wildlife. An unbalanced wildlife population leads to an increase in the numbers of destructive insects and rodents and other undesirable animal life. On most farms, the wildlife habitat can be improved by practices that supply or increase food and cover (*2*).

For maximum wildlife population on a farm, as many habitat areas as possible should be developed. A single wildlife area is good, but travel lanes and vegetative borders on all parts of a farm will increase capacity to support desirable kinds of wildlife.

Food and cover

The balance between food and cover for wildlife is ideal on only a few farms in the county. Some farms consist almost entirely of soils that are used to produce row crops or grain. On these farms, food for wildlife may be abundant, but cover is likely to be scarce. Other farms consist largely of soils suitable only for permanent vegetation. On these farms, pasture and woods furnish abundant cover, but food is likely to be scarce.

The different kinds of soils can be managed so that both food and cover are available. On farms used for crops, cover can be provided by leaving vegetation in fence rows, by establishing vegetation in waterways and on the banks of drainage ditches and streams, and by planting windbreaks and perennial borders. In addition to these places of cover, odd areas and areas around ponds and in marshes can be used for both food and cover. On farms used largely for permanent vegetation, food for wildlife can be provided by planting borders that produce seed and fruit and by planting small areas to grasses and conifers.

Distribution of wildlife

Squirrels and rabbits are the most abundant game animals in the county. Rabbits prefer the kind of food and cover to be found in and around cultivated fields. Gray squirrels like large wooded areas, such as those in soil association 1. Fox squirrels prefer small woodlots, wooded areas along streams, and the edges of forests, next to cultivated fields.

The extensive woodlands of soil association 1 provide excellent habitat for deer. The habitat could be improved by developing sources of water. Salt blocks would attract deer, and other kinds of wildlife as well.

Foxes, raccoons, muskrats, minks, skunks, and opossums are hunted for sport but are not trapped or hunted commercially.

Soil associations 1, 2, 3, and 4 provide ample cover for quail, but in associations 3 and 4 food is scarce. In the larger wooded areas, the supply of food can be increased by maintaining small openings and seeding food-producing plants in them.

Mallards and black ducks are the most numerous of more than 25 species of ducks and geese that migrate across the county in spring and fall. Wood ducks nest along the Ohio River bottom lands, competing with raccoons for hollow trees near water. Sloughs along the Ohio River could be developed as waterfowl refuges.

Songbirds of many kinds are numerous. These birds have esthetic value, and some help to control insects. Seed eaters can be attracted by planting a patch of grain sorghum near escape cover. Fruit-producing shrubs are attractive, also, both for the food they produce and as nesting sites.

Ruffed grouse were once important gamebirds in this county, but the population has dwindled. Pheasants are not plentiful, although many have been released. There is no good pheasant range in the county.

Both commercial fishermen and sportsmen fish the Ohio River and its tributaries. The more highly prized

[4] By JAMES MCCALL, biologist, Soil Conservation Service.

TABLE 3.—*Suitability of*

[Dashed lines indicate that the species is not numerous enough on the soils of the given

Group	Site index [1]				Seedling mortality
	Upland oaks	Tulip-poplar	Pin oak	Sweet-gum	
Group 1: AfB2, AfC2, AfC3, AfD, AfD3, CrB2, CrD2, CsC3, CsD3, EkA, EkB2, EkC3, PeA, PeB2, UnB2, UnC3, WnA, WnB2, WnC2, and WnC3.	85–95	90–105	----------	73–78	Slight
Group 2: AfE3, Ln, PrB2, PsE3, and Te	85–95	95–105	----------	----------	Slight to moderate
Group 5: BaA, HeA, HeB2, JoA, JoB2, Mr, WeA, and WeB2.	80–92	90–100	85–100	75–85	Slight
Group 7: CoE and CoG:					
North-facing slopes	80–90	80–95	----------	----------	Slight
South-facing slopes	70–85	----------	----------	----------	Moderate
Group 8-A: Br, Cu, Ha, Hu, Ph, Ra, Wo	----------	95–105	----------	95–105	Slight
Group 8-B: Po	----------	----------	----------	80–90	Slight
Group 9: ScA, ScB2, TlA, TlB2, ZaB2, ZaB3, ZaC2, ZaC3, ZaD, and ZaD3.	75–85	90–100	----------	75–90	Slight
Group 10: WlB2, WlB3, WlC2, WlC3, WlD, WlD3, WlE, and WlE3.					
North-facing slopes	75–85	90–100	----------	----------	Slight
South-facing slopes	65–75	----------	----------	----------	Slight to moderate
Group 11: Gn and Pa	----------	90–105	85–105	85–95	Slight to moderate
Group 12: GmF, MsG, and WmE:					
North-facing slopes	80–90	80–90	----------	----------	Slight
South-facing slopes	70–80	----------	----------	----------	Slight to moderate
Group 13: Ne, Sd, and Wa	----------	----------	90–105	80–90	Slight
Group 14: Gu	----------	----------	----------	----------	Slight to moderate
Group 16: St	----------	----------	----------	----------	Slight
Group 18: MaD2, MaE2, MkC3, MkD3, MkE3, and MkF3.	70–80	----------	----------	----------	Slight

[1] The height reached by the dominant trees in a stand at the age of 50 years.
[2] Natural regeneration is usually more satisfactory than planting.

the soils for woodland

group to be a major crop or that measurement of existing trees, if any, is not feasible]

Erosion hazard	Windthrow hazard	Equipment limitations	Most desirable species in natural stands	Suitable species for planting
Slight to moderate	Slight	Slight to moderate	Tulip-poplar, red oak, white oak, and white ash.	White pine, shortleaf pine, black locust, loblolly pine, and red pine.
Slight to moderate	Slight	Slight to moderate	Tulip-poplar, red oak, white oak, and black walnut.	White pine, shortleaf pine, black locust, and loblolly pine.
Slight	Slight to moderate	Moderate	Tulip-poplar, sweetgum, pin oak, white ash, and soft maple.	White pine, sweetgum, soft maple, and sycamore.
Slight to moderate	Slight	Moderate to severe	White oak, tulip-poplar, white ash, and black oak.	Red pine, white pine, shortleaf pine, and Virginia pine.
Slight to moderate	Slight	Moderate to severe	Chinquapin oak, scarlet oak, chestnut oak, and black oak.	Virginia pine, shortleaf pine, and Austrian pine.
Slight	Slight	Slight	Tulip-poplar, cottonwood, sweetgum, and green ash.	Cottonwood, sweetgum, white pine, and black locust.
Slight	Slight to moderate	Slight	Cottonwood, sweetgum, soft maple, and sycamore.	Cottonwood, sweetgum, white pine, and black locust.
Slight to moderate	Slight	Slight to moderate	White oak, white ash, tulip-poplar, and black oak.	White pine, red pine, shortleaf pine, and Virginia pine.
Moderate	Slight to moderate	Moderate	Tulip-poplar, white oak, red oak, and white ash.	Shortleaf pine, Virginia pine, and white pine.
Slight to moderate	Slight to moderate	Slight to moderate	White oak, black oak, tulip-poplar, and white ash.	Red pine, shortleaf pine, and Virginia pine.
Slight	Moderate	Severe	Sweetgum, pin oak, soft maple, white ash, and tulip-poplar.	(2).
Moderate	Slight to moderate	Severe	White oak, black oak, red oak, tulip-poplar, and white ash.	White pine, red pine, and shortleaf pine.
Moderate	Slight to moderate	Severe	White oak, red oak, and white ash.	Shortleaf pine, Virginia pine, and loblolly pine.
Slight	Moderate	Moderate	Sweetgum, pin oak, soft maple, white ash, and green ash.	Cottonwood, sycamore, and sweetgum.[2]
Severe	Moderate	Severe	(3)	Shortleaf pine, Virginia pine, loblolly pine, and white pine.
Slight to moderate	Slight	Severe	Cottonwood, sycamore, soft maple, and green ash.	Virginia pine, shortleaf pine, and cottonwood.
Slight to moderate	Slight	Moderate	White oak, black oak, bur oak, and basswood.	White pine, shortleaf pine, and black locust.

[3] There are few, if any, existing stands of trees on Gullied land. Pines are planted mainly for control of erosion.

sport fish include bass, bluegill, crappies, channel catfish, and perch (fresh-water drumfish). Carp, sucker, buffalofish, and pan fish are taken on sports tackle. Tributaries of the Middle Fork of the Anderson River, including Sulphur, Theis, and Kraus Creeks, normally have good runs of suckers during the spring spawning season.

Predators, including hawks, owls, and foxes, are numerous. Most are beneficial to man because they prey on mice and other rodents. The extensive wooded areas provide protection for dens and nests.

Engineering Uses of the Soils [5]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. The properties most important to engineers are permeability, shear strength, compaction characteristics, drainage, shrink-swell characteristics, grain size, plasticity, and pH. Also important are the depth to the water table and to bedrock. Soil development related to topographic position may be significant.

Information in this soil survey can be used to—

1. Make studies that will aid in selecting and developing sites for industrial, business, residential, and recreational uses.
2. Make preliminary evaluations that will aid in selecting locations for highways and airports and in planning detailed surveys of the soils at the site.
3. Develop information for the design of drainage systems, farm ponds, diversion terraces, and other structures for soil and water conservation.
4. Locate possible sources of sand and gravel.
5. Correlate performance of engineering structures with soil mapping units to develop information that can be useful in designing and maintaining such structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement information obtained from published maps, reports, and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to a particular area.

With the use of the soil map for identification, the engineering interpretations reported here can be useful for many purposes. It should be emphasized that they do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads or excavations deeper than the depths of layers here reported. Even in these situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that may be expected.

Much of the information in this section is presented in tables. Only the data in table 4 are from actual laboratory tests. The estimates in table 5 and the interpretations in table 6 are based on comparisons of soils with those tested. At many construction sites, major variations in soil characteristics occur within the depth of the proposed excavation, and several kinds of soil occur within short distances. Specific laboratory data on engineering properties of the soil at the site should be obtained before planning detailed engineering work.

Some of the terms used in this publication have a special meaning to soil scientists and a different meaning to engineers. The Glossary at the back of the report defines many such terms as they are used in soil science.

Engineering classification systems

Two systems of classifying soils for engineering purposes are in general use. Classification of the soils of Perry County according to both of these systems is given in this survey. The system that is used by the American Association of State Highway Officials (AASHO) (*1*) is based on field performance of soils in highways. In this system soil materials are classified into seven principal groups, designated A-1 through A-7. The best materials for use in highway subgrades (gravelly soils of high bearing capacity) are classified as A-1, and the poorest (clayey soils having low strength when wet) are classified A-7. The relative engineering value of the soils within each group is indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest.

The Unified system of soil classification was developed by the Waterways Experiment Station, Corps of Engineers (*11*). This system is based on identification of soils according to texture and plasticity and on performance as engineering construction material. In this system, soils are identified as coarse grained (eight classes), fine grained (six classes), or highly organic.

Test data

Table 4 gives test data for samples of eight of the soil series of the county. Selected layers of each soil were sampled, and the samples were tested by standard procedures in the laboratories of the Joint Highway Research Project at Purdue University, under the sponsorship of the Bureau of Public Roads. These samples do not represent all of the soils of Perry County, or even the maximum range of characteristics of each series sampled, because not all of the layers of each profile were sampled. The resulting data have been used, however, as a general guide in estimating the engineering properties of the soils of the county.

The data given in table 4 were obtained by mechanical analysis and by tests made to determine the liquid limit and plastic limit of the soil material. The mechanical analysis was made by a combination of the sieve and hydrometer methods. The terms "sand," "silt," and "clay" do not mean the same to engineers as to soil scientists, and for this reason, the percentages determined by these tests should not be used as a basis for naming textural classes of soils. To soil scientists, for example, "clay" means the mineral grains less than 0.002 millimeter in

[5] By MAX L. EVANS, area engineer, Soil Conservation Service.

diameter, but to engineers it may mean all mineral grains less than 0.005 millimeter in diameter.

Tests for liquid limit and plastic limit measure the effect of water on the consistence of soil material. As the moisture content of a clayey soil is increased from a very dry state, the material changes from a solid to a semisolid to a plastic state. As the moisture content is further increased, the material changes, when disturbed, from a plastic state to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material changes, when disturbed, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is in a plastic condition.

Table 4 also gives data on the relationship between the moisture content and the density of the soil when compacted, as determined by the standard methods described in AASHO Designation: T 99–57 (*1*). If the soil material is compacted at successively higher moisture content, assuming that the same amount of force is used in compacting the soil, the density of the compacted material increases, until the "optimum moisture content" is reached. After that, the density decreases as the moisture content increases. The ovendry weight, in pounds per cubic foot, of the soil at the optimum moisture content is the "maximum dry density." Data on the relationship of moisture to density are important in planning earthwork, because generally the soil is most stable if it is compacted to about its maximum dry density when it is at approximately the optimum moisture content.

Estimated properties

Table 5 gives estimates of some of the soil properties that are significant in engineering. The estimates are based on the test data in table 4, on comparison of other soils with those tested, and on experience in the field. These estimates should not be considered a substitute for detailed examination at the specific site of the proposed construction.

The information in this table generally applies to a depth of 5 feet or less. In most cases only the major horizons are described. Special horizons are described if they have engineering properties significantly different from adjacent horizons. Frost action, described in the column headed "Frost potential," includes heave caused by ice lenses and the subsequent loss of strength as a result of excess moisture during a thaw. Frost action is a hazard only if the soil is susceptible, if there is a source of water while the temperature is below freezing, and if freezing temperature continues long enough for the ground to freeze.

Engineering interpretations

Table 6 gives estimates of the suitability of the soils for engineering uses. The data applies to the soil considered representative of the series. A profile typical of each series is described in the section "Descriptions of the Soils."

Some soil features are favorable for certain kinds of engineering work but unfavorable for others. For example, a highly permeable substratum is a desirable feature if the soil is to be used as a location for a highway but an undesirable feature if the site is to be used for a farm pond.

Formation and Classification of the Soils

This section discusses the major factors of soil formation as they relate to the soils of Perry County, the processes of soil formation, and the system of classifying soils into categories broader than the series.

Factors of Soil Formation

The characteristics of a soil are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief or lay of the land; and (5) the length of time the parent material has been in place and subject to the soil-forming processes.

Climate and vegetation are the active factors of soil genesis. They act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in some cases, determines it almost entirely. Finally, time is needed for changing parent material into a soil. Usually, a long period of time is needed for distinct horizons to develop.

Few generalizations can be made regarding the effect of any one factor of soil formation, because the effect of each is modified by the other four. Many of the processes of soil development are unknown.

Parent material

The parent material from which the soils of Perry County were derived consists of sandstone, limestone, shale, lacustrine deposits of Wisconsin age, and loess. The relationship of the underlying material to the surface of Perry County, as a whole, is shown in figure 12.

Figure 13 shows the geologic strata underlying an area adjacent to the Ohio River. The strata of bedrock nearest the surface are sedimentary rocks of late Mississippian and early Pennsylvanian age.

Formations of late Mississippian age include bedded shale, sandstone, siltstone, and limestone. The limestone is thick enough to be quarried in areas near Derby and Branchville. Thin strata crop out north of Rome, mainly east of State Highway 37. Corydon and Crider soils are examples of soils that developed in material weathered mainly from limestone.

Formations of early Pennsylvanian age include thick- and thin-bedded sandstone, shale, and mudstone of the Mansfield formation, which is extensive west of State Highway 37. Some parts of this formation contain thin strata of coal. Soils of the Johnsburg and Tilsit series are examples of soils that formed mainly in material

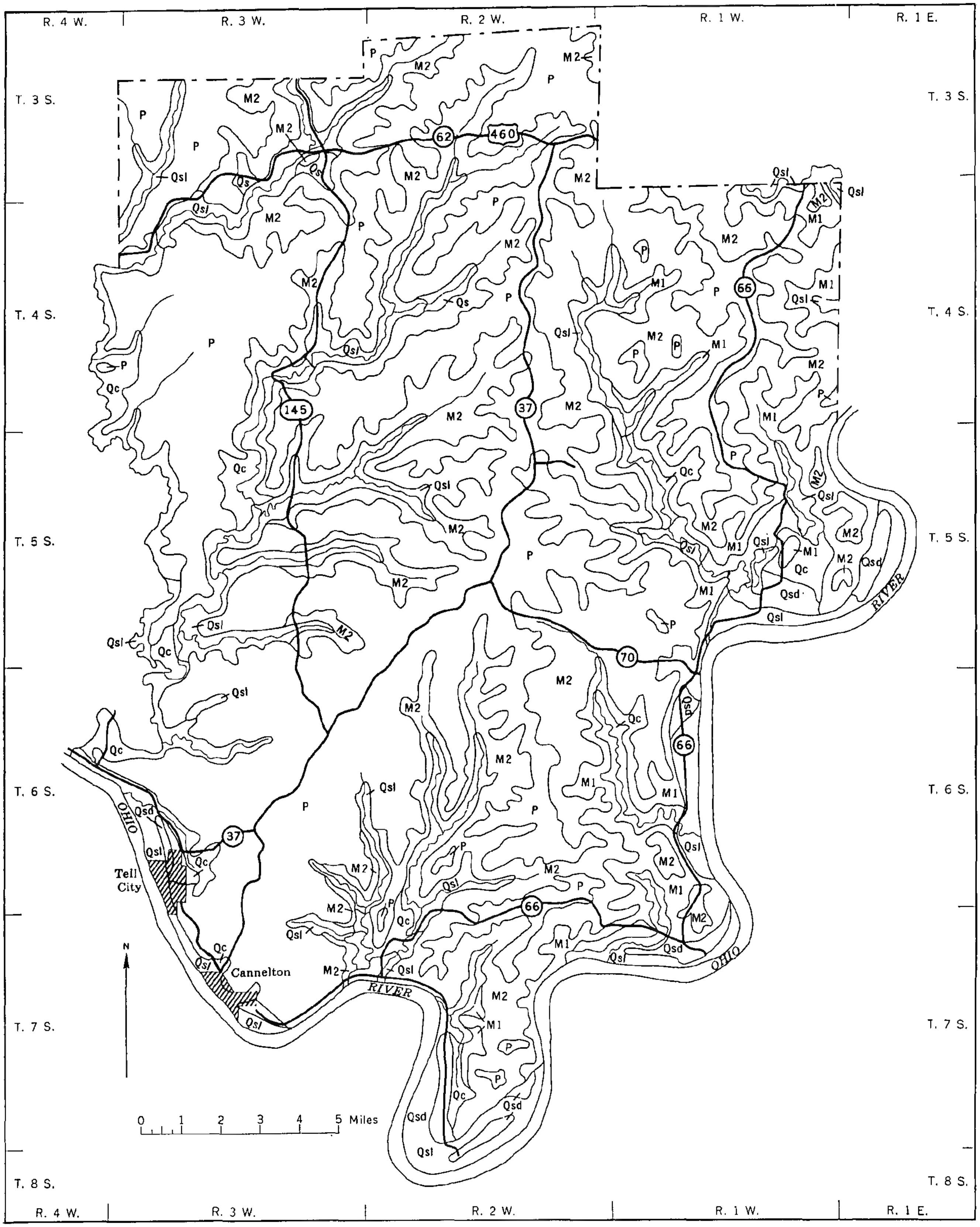

Figure 12.—**Geologic materials in Perry County. Explanation on facing page.**

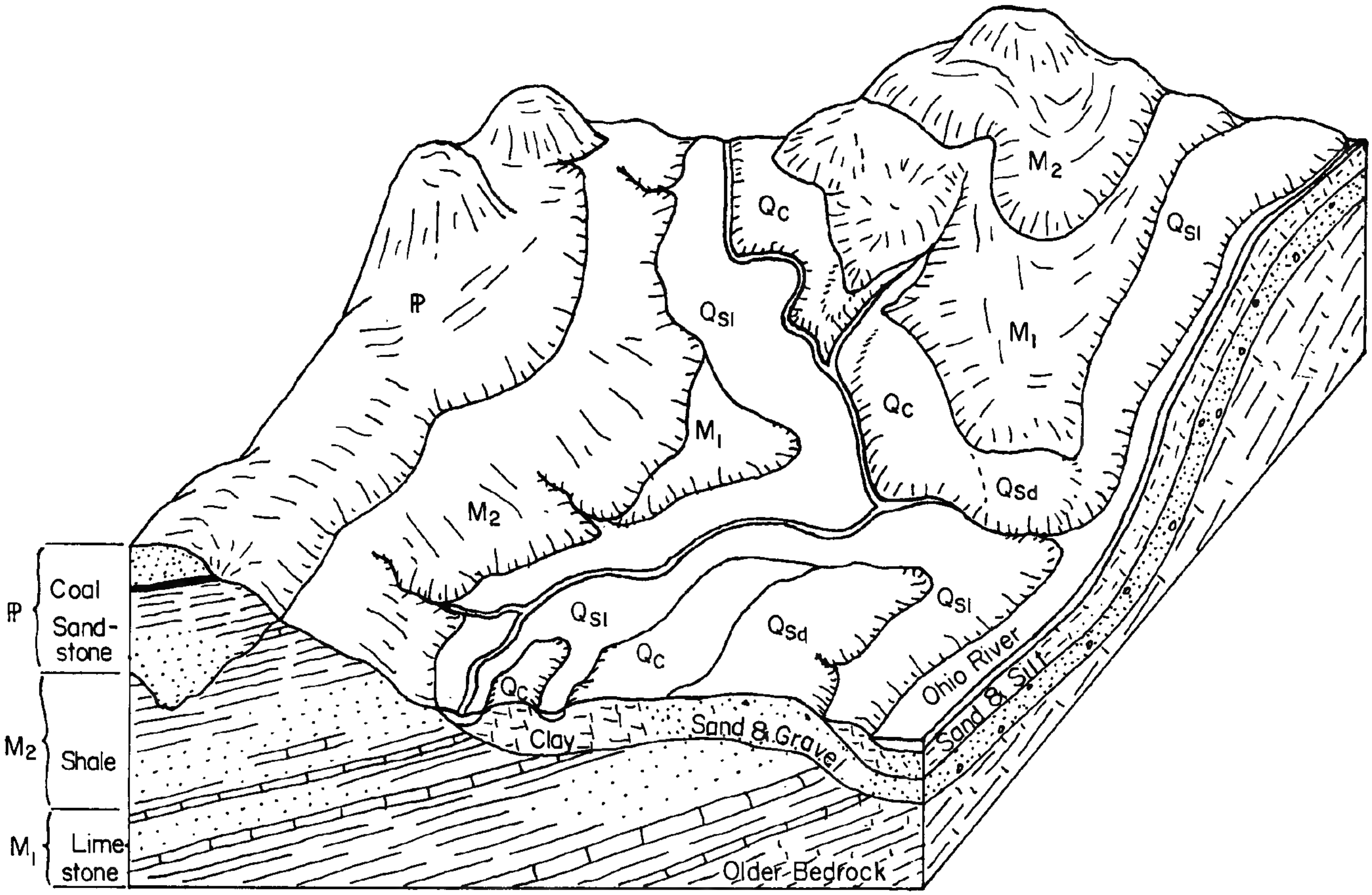

Figure 13.—**Cross section showing geologic strata underlying an area of Perry County.**

weathered from sandstone and shale or mudstone. There are some geologic strata of late Mississippian age in the deeper valleys in areas underlain by the Mansfield formation.

In this county bedrock dips to the west at a rate of about 25 feet per mile. This dip is part of a regional structural dip that crosses the State from a high point in the southeast to a low point in the extreme southwest.

Stream terraces, or level benches above stream bottoms, occur along tributary streams in the county and along the Ohio River. These terraces formed as a result of the increase in size of the Ohio River caused by melting of continental glaciers in the Ohio River basin during the Pleistocene epoch. In the northern part of the county are low, weakly developed terraces. Soils of the Elkinsville and Bartle series are examples of soils that formed on such terraces. Along tributary streams in the southern part of the county are lacustrine terraces. Soils of the Markland and McGary series are examples of soils that developed in lacustrine deposits. More extensive terraces occur along the Ohio River. Soils of the Wheeling and Sciotoville series are examples of soils that developed on river terraces.

During the Pleistocene epoch a blanket of Peorian loess (windblown silt) was deposited over the county. The loess is as much as 10 feet thick in areas near the Ohio River, thinner in other parts of the county, and ordinarily about 2 to 3 feet thick on ridgetops. Soils of the Alford series are representative of soils that developed in a deep deposit of loess. Soils of the Zanesville series are representative of soils that developed in a thin mantle of loess over material weathered from sandstone and shale.

EXPLANATION OF FIGURE 12

Unconsolidated Quaternary (Pleistocene) deposits—
Qsl—Sand, silt, and clay; recent stream deposits.
Qc—Silt and clay; lake deposits.
Qsd—Sand, silt, and gravel; melt-water deposits.
Qs—Clayey sand and silt; older stream deposits.
Pennsylvanian rocks—
P—Sandstone, mudstone, shale, and clay; thin beds of coal, limestone, and sedimentary iron ore.
Mississippian rocks—
M2—Shale, sandstone, and thin beds of limestone.
M1—Sandstone, shale, and limestone.

Climate

The climate of Perry County is midcontinental. It is characterized by a wide range in temperature from summer to winter. The mean daily maximum temperature is about 90° F. in July, and the mean daily minimum is about 26° in January. The climate is so uniform throughout the county that differences among the soils cannot be attributed to differences in climate.

TABLE 4.—*Engineering*

[Tests performed by Purdue University in cooperation with the Indiana State Highway Department and the U.S. Department of Commerce,

Soil name and location	Parent material	Purdue University report No.	Depth from surface	Moisture-density data [1] Maximum dry density	Moisture-density data [1] Optimum moisture
			In.	*Lb. per cu. ft.*	*Pct.*
Bartle silt loam: SW¼SW¼ sec. 26, T. 3 S., R. 3 W. (modal).	Old acid alluvium.	3-1	0-8	105	19
		3-2	18-32	104	19
		3-3	32-50	108	17
		3-4	74-82	106	18
Elkinsville silt loam: NE¼SW¼ sec. 27, T. 4 S., R. 3 W. (modal).	Old acid alluvium on terraces.	2-1	0-8	108	17
		2-2	15-28	112	15
		2-3	50-60	113	15
Princeton fine sandy loam: SW¼NW¼ sec. 33, T. 7 S., R. 2 W. (modal).	Windblown sand and silt.	9-1	0-10	103	19
		9-2	20-40	111	15
		9-3	74-86	105	14
Sciotoville silt loam: SW¼NE¼ sec. 7, T. 7 S., R. 1 W. (modal).	Alluvium on terrace benches.	7-1	0-9	107	17
		7-2	26-46	107	17
		7-3	60-75	110	16
Tilsit silt loam: NE¼NE¼ sec. 27, T. 4 S., R. 1 W. (modal).	Loess overlying shale and sandstone.	6-1	0-8	100	22
		6-2	12-21	105	19
		6-3	25-41	105	19
Wellston silt loam: NE¼SW¼ sec. 35, T. 5 S., R. 3 W. (modal).	Silt over sandstone and shale.	4-1	0-9	99	22
		4-2	13-26	107	16
Wheeling silt loam: SE¼NE¼ sec. 30, T. 6 S., R. 3 W. (modal)	Alluvium.	1-1	0-9	101	21
		1-2	16-32	107	17
		1-3	50-60	107	17
Zanesville silt loam: NW¼SW¼ sec. 35, T. 4 S., R. 2 W. (modal).	Loess overlying sandstone and shale.	10-1	0-10	100	22
		10-2	15-25	106	18
		10-3	31-50	106	18
NE¼SE¼ sec. 32, T. 4 S., R. 1 W.	Loess overlying sandstone and shale.	5-1	14-25	104	19
		5-2	41-61	116	13

[1] Based on AASHO Designation: T 99-57, Method A (*1*).

[2] Analysis according to AASHO Designation: T 88-57 (*1*). Results by this procedure frequently differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for use in naming textural classes for soils.

test data

Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis data [2]								Liquid limit	Plasticity index	Classification	
Percentage passing sieve—				Percentage smaller than—							
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.			AASHO	Unified [3]
								Pct.			
100	99	98	89	80	56	23	18	33	7	A-4(8)	ML
99	98	95	87	84	66	30	23	29	9	A-4(8)	CL
100	99	94	87	82	65	35	25	33	11	A-6(8)	ML-CL
	100	96	93	90	78	40	31	37	11	A-6(8)	ML-CL
	100	99	78	70	51	25	18	27	7	A-4(8)	ML-CL
		100	81	75	60	33	26	34	13	A-6(9)	CL
		100	55	47	35	25	21	27	7	A-4(4)	ML-CL
	100	99	50	43	25	10	8	(4)	(4)	A-4(3)	SM
	100	99	78	70	49	30	26	32	13	A-6(9)	CL
	100	99	12	11	11	9	9	(4)	(4)	A-2-4(0)	SP-SM
99	99	98	80	72	46	22	16	27	4	A-4(8)	ML-CL
	100	97	81	72	55	35	26	36	10	A-4(8)	ML-CL
	100	99	92	89	73	40	30	40	17	A-6(11)	CL
	100	96	90	86	66	26	17	33	7	A-4(8)	ML
	100	98	94	92	78	36	27	42	14	A-7-6(10)	ML
	100	98	93	90	76	40	30	43	21	A-7-6(12)	CL
99	99	98	94	89	66	19	14	(4)	(4)	A-4(8)	ML
[5] 97	96	96	91	87	67	34	29	38	10	A-6(8)	ML
		100	96	92	71	38	25	41	16	A-7-6(10)	ML-CL
		100	90	81	60	38	31	37	15	A-6(10)	CL
	100	99	86	80	57	31	23	34	13	A-6(9)	CL
	100	99	96	89	60	21	16	32	6	A-4(8)	ML
	100	99	96	94	80	38	29	39	7	A-4(8)	ML
	100	99	94	91	77	36	29	40	16	A-6(10)	ML-CL
		100	95	92	80	40	32	43	21	A-7-6(13)	CL
	100	99	80	74	56	26	21	26	8	A-4(8)	CL

[3] SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of A-line are to be given a borderline classification. An example of a borderline classification so obtained is ML–CL.
[4] Nonplastic.
[5] 100 percent passed the ¾-inch sieve.

TABLE 5.—*Estimated*

[Estimated properties of soils mapped as associations are given under the series names of the individual components. The

Soil series and map symbols	Depth to bed-rock	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	Inches	*Inches*			
Alford (AfB2, AfC2, AfC3, AfD, AfD3, AfE3).	72+	0–15	Silt loam	CL	A–4
		15–26	Heavy silt loam	CL	A–4
		26–40	Light silty clay loam	CL	A–7
		40–124	Silt loam and silt	ML	A–4
Bartle (BaA)	72+	0–32	Silt loam	ML or CL	A–4
		32–60	Silt loam to light silty clay loam (fragipan).	CL or ML	A–6
		60–82	Layers of silty clay loam, silt loam, and fine sandy loam.	ML or CL	A–6
Bruno (Br)	72+	0–18	Fine sandy loam	SM	A–2
		18–32	Loamy fine sand	SM	A–2–4
		32–50	Stratified loam and fine sandy loam with lenses of silt and fine sand.	SM	A–2–4
Corydon (CoE, CoG)	10–20	0–6	Stony silt loam and stony silty clay loam.	SM	A–4
		6–14	Stony silty clay to clay	SC	A–7
		14	Bedrock.		
Crider (CrB2, CrD2, CsC3, CsD3)	42–72+	0–13	Silt loam to heavy silt loam	ML or CL	A–4
		13–32	Silty clay loam	CL	A–6
		32–44	Silty clay to clay	CH	A–7
		44	Bedrock.		
Cuba (Cu)	72+	0–44	Silt loam	ML	A–4
		44–59	Loam	ML	A–4
Elkinsville (EkA, EkB2, EkC3)	72+	0–40	Silt loam	ML or CL	A–4 or A–6
		40–60	Loam	CL or ML	A–4
Gilpin (GmF) For Muskingum part, see Muskingum series. For Wellston part, see Wellston series.	20–36	0–15	Gritty silt loam	ML	A–4
		15–26	Heavy silt loam	ML or CL	A–4
		26–30	Channery silt loam	ML	A–4
		30	Bedrock.		
Ginat (Gn)	72+	0–23	Silt loam	ML	A–4
		23–38	Light silty clay loam (fragipan).	ML or CL	A–4
		38–74	Silty clay loam	CL	A–6
		74–80	Layers of loam, silt loam, and silty clay loam.	CL or ML	A–4
Haymond (Ha)	72+	0–60	Silt loam	ML	A–4
Henshaw (HeA, HeB2)	72+	0–12	Silt loam	ML or CL	A–4
		12–40	Silty clay loam to heavy silty clay loam.	CL	A–6
		40–58	Silty clay loam to silt loam	CL or CH	A–7
		58–65	Stratified silt loam, silty clay loam, and silty clay.		
Huntington (Hu)	72+	0–9	Silt loam	ML	A–4
		9–30	Silt loam to heavy silt loam	ML	A–4
		30–54	Light silty clay loam	ML or CL	A–4
Johnsburg (JoA, JoB2)	48–72+	0–22	Silt loam	ML	A–4
		22–60	Light silty clay loam (fragipan)	CL	A–6
		60–66	Silt loam	ML or CL	A–4
		66	Bedrock.		
Lindside (Ln)	72+	0–25	Silt loam	ML	A–4
		25–60	Light silty clay loam	ML or CL	A–4

See footnote at end of table.

properties

miscellaneous land types are not listed in the table, because the properties are too variable for reliable estimates to be made]

Percentage passing sieve [1]—			Permeability	Available water capacity	Reaction	Frost potential	Shrink-swell potential
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)					
			Inches per hour	*Inches per inch of soil*	*pH*		
95–100	95–100	90–95	0. 8–2. 5	0. 20	5. 6–6. 0	High	Low.
95–100	95–100	90–95	0. 8–2. 5	. 20	5. 0–5. 5	High	Low.
95–100	90–95	80–85	0. 8–2. 5	. 18	5. 0–5. 5	Moderate	Moderate.
95–100	90–95	90–95	0. 8–2. 5	. 20	5. 5–6. 0	Moderate to high	Low.
95–100	95–100	85–95	0. 8–2. 5	. 20	5. 0–6. 5	High	Moderate.
95–100	95–100	85–95	0. 05–0. 2	. 19	4. 5–5. 5	High	Moderate.
100	95–100	85–95	0. 2–0. 8	. 17	4. 5–5. 5	High	Moderate.
95–100	90–100	25–35	2. 5–5. 0	. 14	6. 5–7. 3	Moderate	Low.
95–100	85–95	10–20	5. 0–10. 0	. 05	6. 5–7. 3	Moderate	Low.
95–100	85–95	25–35	5. 0–10. 0	. 08	6. 5–7. 3	Moderate	Low.
95–100	85–95	45–50	0. 2–0. 8	. 20	6. 5–7. 3	Moderate	Moderate.
95–100	85–95	45–50	<0. 05	. 17	6. 5–7. 3	High	High.
100	95–100	90–100	0. 8–2. 5	. 20	5. 5–6. 5	High	Moderate.
100	95–100	90–100	0. 2–0. 8	. 19	4. 5–5. 0	High	Moderate.
95–100	90–95	85–95	<0. 05	. 17	5. 0–7. 3	High	High.
100	95–100	70–75	0. 8–2. 5	. 20	5. 0–6. 0	High	Low.
100	95–100	70–75	0. 8–2. 5	. 18	5. 0–6. 0	Moderate	Moderate.
100	95–100	75–85	0. 8–2. 5	. 20	5. 0–6. 5	High	Moderate.
100	95–100	75–85	0. 8–2. 5	. 19	4. 5–5. 0	High	Moderate.
95–100	95–100	90–100	0. 8–2. 5	. 20	5. 0–5. 5	High	Moderate.
95–100	95–100	90–100	0. 8–2. 5	. 20	4. 5–5. 0	High	Moderate.
95–100	95–100	90–100	0. 8–2. 5	. 20	4. 5–5. 0	High	Moderate.
100	95–100	80–90	0. 8–2. 5	. 20	5. 0–5. 5	Moderate	Moderate.
100	95–100	80–90	0. 2–0. 8	. 19	4. 5–5. 0	High	Moderate.
100	95–100	80–90	0. 05–0. 2	. 19	4. 5–5. 0	High	Moderate.
100	95–100	80–90	0. 8–2. 5	. 19	4. 5–5. 0	High	Moderate.
100	95–100	90–100	0. 8–2. 5	. 20	6. 0–6. 5	Moderate	Low to moderate.
95–100	95–100	85–95	0. 8–2. 5	. 20	5. 5–6. 0	Moderate	Low to moderate.
95–100	95–100	85–95	0. 05–0. 2	. 18	5. 5–6. 0	Moderate	Moderate.
95–100	95–100	85–95	0. 2–0. 8	. 17	7. 7–8. 4	Moderate	Moderate to high.
100	100	95–100	0. 8–2. 5	. 20	6. 5–7. 3	Moderate	Low.
100	100	95–100	0. 8–2. 5	. 20	6. 5–7. 3	Moderate	Low.
100	100	95–100	0. 8–2. 5	. 20	6. 5–7. 3	Moderate	Low.
95–100	95–100	85–95	0. 8–2. 5	. 20	4. 5–6. 0	Moderate	Moderate.
95–100	95–100	95–100	0. 05–0. 2	. 19	4. 5	High	Moderate.
95–100	95–100	85–95	0. 2–0. 8	. 19	4. 5	High	Moderate.
100	100	90–100	0. 8–2. 5	. 20	6. 5–7. 3	Moderate	Low.
100	100	90–100	0. 8–2. 5	. 17	6. 5–7. 3	Moderate	Low to moderate.

TABLE 5.—*Estimated*

Soil series and map symbols	Depth to bed-rock	Depth from surface	Classification: USDA texture	Unified	AASHO
	Inches	*Inches*			
Markland (MaD2, MaE2, MkC3, MkD3, MkE3, MkF3).	72+	0–12	Silt loam and light silty clay loam.	CL	A–6
		12–28	Silty clay	CH	A–7
		28–60	Stratified clay and silty clay loam.	CL or CH	A–7
McGary (Mr)	72+	0–10	Silt loam	ML or CL	A–6
		10–18	Silty clay loam	CL	A–6
		18–63	Silty clay	CL or CH	A–7
Muskingum (MsG). For Gilpin part, see Gilpin series.	20–36	0–34	Channery silt loam	ML	A–4
		34	Bedrock.		
Newark (Ne)	72+	0–24	Silt loam	ML	A–4
		24–60	Light silty clay loam	ML or CL	A–4
Patton (Pa)	72+	0–33	Silty clay loam	CL	A–6
		33–48	Silty clay	CL or CH	A–7
		48–72	Silty clay loam and layers of silt loam, silty clay, or clay.	CL	A–7
Pekin (PeA, PeB2)	72+	0–26	Silt loam	ML or CL	A–4 or A–6
		26–58	Light silty clay loam (fragipan)	CL	A–6
		58–72	Layers of silt, silt loam, and fine sand.	ML or CL	A–6 or A–4
Philo (Ph)	36–60+	0–25	Silt loam	ML	A–4
		25–42	Loam	ML	A–4
Pope (Po)	36–60	0–5	Loam	ML	A–4
		5–18	Fine sandy loam to sandy loam	SM	A–4
		18–42	Layers of channery sandy loam, sand, and gravel.	GM	A–1–b
Princeton (PrB2, PsE3)	72+	0–15	Fine sandy loam	ML or SM	A–4
		15–48	Loam, sandy clay loam, and fine sandy loam.	CL	A–6
		48–86	Fine sand with bands of loamy sand.	SM or SP	A–2–4
Rahm (Ra)	72+	0–23	Silt loam	ML	A–4
		23–30	Heavy silt loam	ML	A–4
		30–53	Light silty clay loam	ML or CL	A–4
Sciotoville (ScA, ScB2)	72+	0–26	Silt loam	ML or CL	A–4
		26–46	Heavy silt loam (fragipan)	ML or CL	A–4
		46–60	Silty clay loam (fragipan)	CL	A–6
		60–100	Silty clay loam, grading to stratified silt and sandy material.	CL	A–6
Stendal (Sd)	36–72+	0–24	Silt loam	ML	A–4
		24–42	Loam	ML	A–4
Tilsit (TlA, TlB2)	48–72+	0–23	Silt loam	ML	A–4
		23–26	Silty clay loam	CL	A–7–6
		26–65	Silty clay loam (fragipan)	CL	A–7–6
		65	Bedrock.		
Uniontown (UnB2, UnC3)	72+	0–10	Silt loam	ML or CL	A–4
		10–25	Silty clay loam	CL	A–6
		25–35	Heavy silty clay loam	CL or CH	A–7
		35–40	Silty clay loam	CL	A–6
Wakeland (Wa)	72+	0–40	Silt loam	ML	A–4

See footnote at end of table.

properties—Continued

Percentage passing sieve [1]— No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Permeability	Available water capacity	Reaction	Frost potential	Shrink-swell potential
			Inches per hour	*Inches per inch of soil*	*pH*		
100	95–100	90–95	0. 8–2. 5	. 20	6. 5–7. 3	High	Moderate.
95–100	95–100	90–95	0. 05–0. 2	. 15	5. 5–6. 0	Moderate to high	High.
95–100	95–100	90–95	0. 05–0. 2	. 15	7. 7–8. 4	Moderate to high	High.
100	95–100	85–100	0. 8–2. 5	. 20	6. 5–7. 3	High	Moderate.
95–100	95–100	90–95	<0. 05	. 15	5. 5–6. 0	Moderate	Moderate.
95–100	95–100	90–95	<0. 05	. 15	7. 7–8. 4	Moderate to high	High.
95–100	85–95	50–60	0. 8–2. 5	. 20	4. 5–5. 5	High	Moderate.
100	100	90–100	0. 8 2. 5	. 20	6. 5–7. 3	Moderate to high	Low.
100	100	90–100	0. 2–0. 8	. 19	6. 5–7. 3	Moderate to high	Low to moderate.
100	95–100	85–95	0. 2–0. 8	. 19	6. 0–7. 3	Moderate to high	Moderate.
100	95–100	85–95	0. 05–0. 2	. 17	5. 5–6. 0	Moderate to high	High.
100	95–100	85–95	0. 05 0. 2	. 19	7. 7–8. 4	Moderate to high	Moderate.
100	95–100	75–85	0. 8–2. 5	. 20	5. 0–6. 5	High	Moderate.
100	95–100	75–85	0. 05–0. 2	. 19	4. 5–5. 0	High	Moderate.
100	95–100	75–85	0. 8 2. 5	. 17	4. 5–5. 0	High	Low to moderate.
100	95–100	70–75	0. 8–2. 5	. 20	6. 0–6. 5	High	Low.
100	95–100	70–75	0. 8–2. 5	. 18	5. 0–5. 5	Moderate	Moderate.
95–100	90–100	70–80	0. 8–2. 5	. 16	5. 5–6. 0	Moderate	Moderate.
85–95	80–90	35–45	2. 5–5	. 14	5. 0–5. 5	Moderate to low	Moderate.
40-50	30-40	15–20	5–10	. 08	5. 0–5. 5	Moderate to low	Moderate to low.
100	95–100	45–55	2. 5–5. 0	. 12	5. 0–6. 0	High	Low.
100	95–100	60–70	0. 8–2. 5	. 16	5. 0–5. 5	Moderate to high	Moderate.
100	80–90	5–15	5. 0 10. 0	. 04	6. 5–7. 8	Low	Low.
100	100	90–100	0. 8–2. 5	. 20	6. 5–7. 3	Moderate to high	Low.
100	100	90–100	0. 2–0. 8	. 19	5. 0–5. 5	Moderate to high	Low to moderate.
100	100	90–100	0. 2–0. 8	. 17	4. 5–5. 0	Moderate to high	Low to moderate.
95–100	95–100	80–90	0. 8–2. 5	. 20	5. 0–6. 0	High	Low to moderate.
100	95–100	80–90	0. 05–0. 2	. 20	4. 5–5. 0	High	Moderate.
100	95–100	80–90	0. 05–0. 2	. 19	4. 5–5. 0	High	Moderate.
100	95–100	80–90	0. 8 2. 5	. 19	4. 5–5. 0	High	Moderate.
100	95–100	70-75	0. 8–2. 5	. 20	5. 0–6. 0	High	Low.
100	95–100	70–75	0. 8–2. 5	. 18	4. 5–5. 0	Moderate	Moderate.
95–100	95–100	85–95	0. 8–2. 5	. 20	5. 5–6. 5	High	Moderate.
95–100	95–100	95–100	0. 2–0. 8	. 19	4. 5–5. 0	High	Moderate.
100	95–100	85–95	0. 05–0. 2	. 19	4. 5-5. 0	High	High.
100	95–100	95–100	0. 8–2. 5	. 20	5. 5–6. 5	Moderate	Low to moderate.
95–100	95–100	95–100	0. 2–0. 8	. 19	5. 5–6. 0	Moderate	Moderate.
95–100	95–100	95–100	0. 05–0. 2	. 18	6. 5–7. 3	Moderate	Moderate to high.
95–100	95–100	95–100	0. 2–0. 8	. 19	7. 7–8. 4	Moderate	Moderate.
100	95–100	90–100	0. 8–2. 5	. 20	6. 0–6. 5	Moderate	Low to moderate.

TABLE 5.—*Estimated*

Soil series and map symbols	Depth to bedrock	Depth from surface	Classification: USDA texture	Unified	AASHO
	Inches	*Inches*			
Weinbach (WeA, WeB2)	72+	0–23	Silt loam	ML or CL	A–4
		23–52	Silt loam to silty clay loam (fragipan).	CL	A–6
		52–65	Silty clay loam, grading to layers of silt and sandy material.	CL or ML	A–6 or A–4
Wellston (WlB2, WlB3, WlC2, WlC3, WlD, WlD3, WlE, WlE3, WmE). For Gilpin part of WmE, see Gilpin series. For Muskingum part of WmE, see Muskingum series.	30–60	0–13	Silt loam	ML	A–4
		13–26	Heavy silt loam	ML or CL	A–6
		26–46	Stony silt loam	ML	A–4
		46	Bedrock.		
Wheeling (WnA, WnB2, WnC2, WnC3)	72+	0–16	Silt loam	ML or CL	A–4 or A–6
		16–32	Silty clay loam	CL	A–6
		32–60	Silt loam	CL	A–6
Woodmere (Wo)	72+	0–22	Silt loam	ML	A–4
		22–51	Silty clay loam	ML or CL	A–4
Zanesville (ZaB2, ZaB3, ZaC2, ZaC3, ZaD, ZaD3).	48–72	0–15	Silt loam	ML or CL	A–4
		15–31	Heavy silt loam	ML or CL	A–6
		31–58	Light silty clay loam (fragipan)	CL	A–6
		58–64	Stony silt loam	ML	A–4
		64	Bedrock.		

[1] The percentages given are estimates, rounded off to the nearest 5 percent.

TABLE 6.—*Engineering*

[Interpretations were not made for miscellaneous land types,

Soil series and map symbols	Suitability as a source of—: Topsoil (surface layer)	Sand and gravel [1]	Material for highway subgrade [2]	Highway location [3]	Agricultural drainage
Alford (AfB2, AfC2, AfC3, AfD, AfD3, AfE3).	Fair: low organic-matter content.	Not suitable	Subsoil. Very poor: medium to high compressibility; moderate to high shrink-swell potential. Substratum. Fair: poor stability and compaction.	Subject to frost heave; cuts and fills needed; exposed cuts subject to erosion.	Not needed; well drained.
Bartle (BaA)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Poor: fair to poor stability and compaction; medium to high compressibility; moderate shrink-swell potential.	Seasonal high water table; subject to frost heave.	Seasonal high water table; slow permeability.

See footnotes at end of table.

properties—Continued

Percentage passing sieve [1]— No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	Permeability	Available water capacity	Reaction	Frost potential	Shrink-swell potential
			Inches per hour	*Inches per inch of soil*	*pH*		
95–100	95–100	80–90	0. 8–2. 5	. 20	5. 0–6. 5	High	Moderate.
100	95–100	80–90	0. 05–0. 2	. 19	4. 5–5. 0	High	Moderate.
100	95–100	80–90	0. 8–2. 5	. 19	4. 5–5. 0	High	Moderate.
95–100	95–100	90–100	0. 8–2. 5	. 20	5. 5–6. 5	High	Moderate.
95–100	95–100	90–100	0. 8–2. 5	. 20	4. 5–5. 0	High	Moderate.
95–100	95–100	90–100	0. 8–2. 5	. 20	4. 5–5. 0	High	Moderate.
100	100	95–100	0. 8–2. 5	. 20	6. 0–7. 3	High	Moderate.
100	100	90–100	0. 2–0. 8	. 19	5. 0 5. 5	High	Moderate.
100	95–100	85–95	0. 8–2. 5	. 18	4. 5–5. 0	High	Low to moderate.
100	100	95–100	0. 8–2. 5	. 20	6. 5–7. 3	Moderate	Low.
100	100	95–100	0. 8–2. 5	. 20	4. 5–5. 5	Moderate	Low.
100	95–100	95–100	0. 8–2. 5	. 20	5. 5–6. 5	High	Moderate.
100	100	95–100	0. 2–0. 8	. 19	4. 5–5. 5	Moderate	Moderate.
100	95–100	90–100	0. 05–0. 2	. 19	4. 5–5. 0	Moderate	High.
100	95–100	90–100	0. 8–2. 5	. 20	4. 5–5. 0	High	Moderate.

interpretations

because the soil material is too variable for reliable evaluation]

Farm ponds: Reservoir areas	Farm ponds: Embankments	Terraces and diversions	Grassed waterways	Soil features affecting use of the soils for foundations for low buildings [4]	Degree of limitation of the soils for disposal fields for septic tanks
Moderate permeability; slow seepage.	Subsoil. Fair to good stability and compaction; slow permeability when compacted; medium to high compressibility; good resistance to piping. Substratum. Poor stability and compaction; moderate permeability when compacted; medium compressibility; poor resistance to piping.	Soil features favorable.	Subject to severe erosion during construction.	Low shrink-swell potential; medium compressibility; soft when wet.	Slight: 0 to 6 percent slopes. Moderate: 6 to 12 percent slopes. Severe: more than 12 percent slopes.
Seepage; lenses of fine sand in substratum; seasonal high water table.	Subsoil and substratum. Fair to poor stability and compaction; medium to high compressibility; poor to good resistance to piping; moderate to slow permeability when compacted.	Not needed; nearly level.	Not needed; nearly level.	Low shrink-swell potential; medium to high compressibility; seasonal high water table.	Severe: seasonal high water table; slow permeability.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as a source of—			Highway location [3]	Agricultural drainage
	Topsoil (surface layer)	Sand and gravel [1]	Material for highway subgrade [2]		
Bruno (Br)	Poor: low organic-matter content; droughty.	Not suitable	Subsoil and substratum. Good: fair stability; good to fair compaction; low shrink-swell potential.	Subject to flooding.	Not needed; well drained.
Corydon (CoE, CoG)	Poor: bedrock at a depth of 10 to 20 inches.	Not suitable; possible source of limestone for crushing.	Not suitable: bedrock at a depth of 10 to 20 inches.	Bedrock at a depth of 10 to 20 inches; 18 to 70 percent slopes.	Not needed; well drained.
Crider (CrB2, CrD2, CsC3, CsD3).	Fair: low organic-matter content.	Not suitable	Subsoil. Poor: fair to good stability and compaction; moderate to high shrink-swell potential. Substratum. Very poor: fair to poor stability and compaction; high compressibility; high shrink-swell potential.	Cuts and fills needed in many places; bedrock at a depth of 42 to 72 inches or more; road cuts subject to erosion.	Not needed; well drained.
Cuba (Cu)	Good	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Subject to flooding and frost heave.	Not needed; well drained.
Elkinsville (EkA, EkB2, EkC3).	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; medium compressibility; moderate shrink-swell potential.	Subject to frost heave.	Not needed; well drained.
Gilpin (GmF). For Muskingum part, see Muskingum series. For Wellston part, see Wellston series.	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; bedrock at a depth of 20 to 36 inches.	Bedrock at a depth of 20 to 36 inches; 18 to 70 percent slopes.	Not needed; well drained.
Ginat (Gn)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; medium compressibility; low to moderate shrink-swell potential.	Seasonal high water table; subject to frost heave.	Slow permeability; seasonal high water table.

See footnotes at end of table.

interpretations—Continued

Farm ponds: Reservoir areas	Farm ponds: Embankments	Terraces and diversions	Grassed waterways	Soil features affecting use of the soils for foundations for low buildings [4]	Degree of limitation of the soils for disposal fields for septic tanks
Material too porous to hold water; subject to flooding.	Subsoil and substratum. Fair stability; good to fair compaction; moderate permeability when compacted; slight compressibility; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Subject to flooding	Severe: subject to flooding.
Not suitable; bedrock at a depth of 10 to 20 inches.	Bedrock at a depth of 10 to 20 inches.	Stony; bedrock at a depth of 10 to 20 inches; 18 to 70 percent slopes.	Stony; bedrock at a depth of 10 to 20 inches; 18 to 70 percent slopes.	Bedrock at a depth of 10 to 20 inches.	Severe: shallow to bedrock; steep.
Seepage through channels in underlying limestone.	Subsoil. Fair to good stability and compaction; slow permeability when compacted; medium to high compressibility; good resistance to piping. Substratum. Fair to poor stability and compaction; high compressibility; slow permeability when compacted; good resistance to piping.	Soil features favorable.	Soil features favorable.	High shrink-swell potential; high compressibility.	Slight: 2 to 6 percent slopes. Moderate: 6 to 12 percent slopes. Severe: more than 12 percent slopes.
Moderate permebility; subject to flooding	Subsoil and substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Soft when wet; subject to flooding.	Severe: subject to flooding.
Moderate permeability; lenses of fine sand in substratum.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Soil features favorable.	Soil features favorable.	Low to moderate shrink-swell potential; medium to high compressibility; soft when wet.	Slight: 0 to 6 percent slopes. Moderate: 6 to 12 percent slopes.
Bedrock at a depth of 20 to 36 inches.	Bedrock at a depth of 20 to 36 inches.	Bedrock at a depth of 20 to 36 inches; 18 to 70 percent slopes.	Bedrock at a depth of 20 to 36 inches; 18 to 70 percent slopes.	Bedrock at a depth of 20 to 36 inches.	Severe: 18 to 70 percent slopes; bedrock at a depth of 20 to 36 inches.
Seasonal high water table; moderate seepage.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; slow permeability when compacted; good resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Seasonal high water table; low to moderate shrink-swell potential; medium to high compressibility.	Severe: seasonal high water table; slow permeability.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as a source of—			Highway location [3]	Agricultural drainage
	Topsoil (surface layer)	Sand and gravel [1]	Material for highway subgrade [2]		
Haymond (Ha)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Subject to flooding and to frost heave.	Not needed; well drained.
Henshaw (HeA, HeB2)	Fair: low organic-matter content.	Not suitable	Subsoil. Poor: medium to high compressibility; moderate to high shrink-swell potential. Substratum. Very poor: fair to poor stability and compaction; high compressibility; high shrink-swell potential.	Seasonal high water table; plastic soil material.	Seasonal high water table; slow permeability.
Huntington (Hu)	Good	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Subject to flooding and frost heave.	Not needed; well drained.
Johnsburg (JoA, JoB2)	Fair: low organic-matter content.	Not suitable	Subsoil. Poor: medium to high compressibility; moderate to high shrink-swell potential. Substratum. Fair: fair stability and compaction; medium compressibility; low to moderate shrink-swell potential.	Seasonal high water table; subject to frost heave.	Seasonal high water table; slowly permeable fragipan.
Lindside (Ln)	Good	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; low to moderate shrink-swell potential.	Subject to flooding and frost heave.	Subject to flooding.
Markland (MaD2, MaE2, MkC3, MkD3, MkE3, MkF3).	Fair if surface layer is silt loam; low organic-matter content. Poor if surface layer is silty clay loam; low organic-matter content.	Not suitable	Subsoil and substratum. Very poor: fair to poor stability and compaction; high compressibility; high shrink-swell potential.	Plasticity; high shrink-swell potential; cuts and fills needed; erosion hazard on side slopes.	Not needed; well drained.

See footnotes at end of table.

interpretations—Continued

Farm ponds: Reservoir areas	Farm ponds: Embankments	Terraces and diversions	Grassed waterways	Soil features affecting use of the soils for foundations for low buildings [4]	Degree of limitation of the soils for disposal fields for septic tanks
Moderate seepage; underlain by stratified sand and silt; subject to flooding.	Subsoil and substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Soft when wet; subject to flooding.	Severe: subject to flooding.
Seasonal high water table.	Subsoil. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping. Substratum. Fair to poor stability and compaction; high compressibility; good resistance to piping; slow permeability when compacted.	Not needed; nearly level.	Not needed; nearly level.	Seasonal high water table; moderate shrink-swell potential; medium compressibility; soft when wet.	Severe: seasonal high water table; slow permeability.
Moderate seepage; underlain by stratified silt and sand; subject to flooding.	Subsoil and substratum. Poor stability and compaction; medium compressibility; poor resistance to piping; moderate permeability when compacted.	Not needed; nearly level.	Not needed; nearly level.	Low shrink-swell potential; medium compressibility; soft when wet; subject to flooding.	Severe: subject to flooding.
Seasonal high water table.	Subsoil. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping. Substratum. Fair stability and compaction; medium compressibility; moderate to slow permeability when compacted; good to poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Low to moderate shrink-swell potential; medium compressibility; seasonal high water table; soft when wet.	Severe: slow permeability; seasonal high water table.
Moderate seepage; underlain by stratified sand, silt, and gravel; subject to flooding.	Subsoil and substratum. Fair to poor stability and compaction; moderate to slow permeability when compacted; medium compressibility; poor to good resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Medium compressibility; soft when wet; subject to flooding.	Severe: subject to flooding.
Soil features favorable.	Subsoil and substratum. Fair to poor stability and compaction; high compressibility; slow permeability when compacted; good resistance to piping.	Soil features favorable.	Soil features favorable.	High shrink-swell potential; medium to high compressibility.	Severe: slow permeability.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as a source of—			Highway location [3]	Agricultural drainage
	Topsoil (surface layer)	Sand and gravel [1]	Material for highway subgrade [2]		
McGary (Mr)	Fair: low organic-matter content.	Not suitable.	Subsoil and substratum. Poor to very poor: fair to poor stability and compaction; high compressibility; high shrink-swell potential.	Seasonal high water table; plasticity; high shrink-swell potential.	Seasonal high water table; very slow permeability.
Muskingum (MsG). For Gilpin part, see Gilpin series.	Poor: channery fragments; bedrock at a depth of 20 to 36 inches.	Not suitable.	Subsoil and substratum. Fair: poor stability and compaction; bedrock at a depth of 20 to 36 inches; many channery fragments.	Stony; bedrock at a depth of 20 to 36 inches.	Not needed; well drained.
Newark (Ne)	Fair: low organic-matter content.	Not suitable.	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; moderate to low shrink-swell potential.	Seasonal high water table; subject to flooding.	Seasonal high water table; subject to flooding.
Patton (Pa)	Fair: medium to high organic-matter content; moderately fine textured.	Not suitable.	Subsoil and substratum. Poor to very poor: fair to poor stability and compaction; medium to high compressibility; moderate to high shrink-swell potential.	Seasonal high water table; subject to ponding.	Seasonal high water table; slowly permeable subsoil.
Pekin (PeA, PeB2)	Fair: low organic-matter content.	Not suitable.	Subsoil and substratum. Poor: fair to good stability and compaction; low to moderate shrink-swell potential.	Subject to frost heave.	Slow permeability; drainage not ordinarily needed; moderately well drained.
Philo (Ph)	Good: medium organic-matter content.	Not suitable.	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low to moderate shrink-swell potential.	Subject to flooding.	Subject to flooding.
Pope (Po)	Fair: low organic-matter content.	Poor: small amounts of stratified sand.	Subsoil. Fair: fair stability; fair to good compaction; slight compressibility; low shrink-swell potential. Substratum. Good: fair stability; fair to good compaction.	Subject to flooding.	Subject to flooding.

See footnotes at end of table.

interpretations—Continued

Farm ponds		Terraces and diversions	Grassed waterways	Soil features affecting use of the soils for foundations for low buildings [4]	Degree of limitation of the soils for disposal fields for septic tanks
Reservoir areas	Embankments				
Seasonal high water table.	Subsoil and substratum. Fair to poor stability and compaction; high compressibility; slow permeability when compacted; good resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	High shrink-swell potential; high compressibility; seasonal high water table.	Severe: very slow permeability; seasonal high water table.
Bedrock at a depth of 20 to 36 inches.	Silty; many channery fragments; bedrock at a depth of 20 to 36 inches.	Bedrock at a depth of 20 to 36 inches.	Bedrock at a depth of 20 to 36 inches.	Bedrock at a depth of 20 to 36 inches.	Severe: bedrock at a depth of 20 to 36 inches.
Slow seepage; subject to flooding; seasonal high water table.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; moderate to slow permeability when compacted; good to poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Soft when wet; medium compressibility; seasonal high water table; subject to flooding.	Severe: subject to flooding; seasonal high water table.
Very slow seepage; seasonal high water table.	Subsoil and substratum. Fair to poor stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Moderate to high shrink-swell potential; medium to high compressibility; seasonal high water table.	Severe: slow permeability; seasonal high water table; subject to ponding.
Moderate seepage; lenses of fine sand in substratum.	Subsoil and substratum. Fair to good stability and compaction; slow permeability when compacted; medium compressibility; good resistance to piping.	Slowly permeable; fragipan at a depth of 20 to 32 inches.	Slowly permeable; fragipan at a depth of 20 to 32 inches.	Medium compressibility; soft when wet.	Severe: slowly permeable fragipan.
Moderate seepage; subject to flooding.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Medium compressibility; soft when wet; subject to flooding.	Severe: subject to flooding.
Material too porous to hold water.	Subsoil and substratum. Fair stability; fair to good compaction; moderate permeability when compacted; slight compressibility; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Subject to flooding__	Severe: subject to flooding.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as a source of—			Highway location [3]	Agricultural drainage
	Topsoil (surface layer)	Sand and gravel [1]	Material for highway subgrade [2]		
Princeton (PrB2, PsE3)	Fair: medium organic-matter content.	Poor: small amounts of stratified sand.	Subsoil. Poor: fair to good stability and compaction; medium to high compressibility; moderate to high shrink-swell potential. Substratum. Good: fair stability; fair to good compaction; low shrink-swell potential; slight to very slight compressibility.	Cuts and fills needed; side slopes erodible; subject to frost heave.	Not needed; well drained.
Rahm (Ra)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; medium compressibility; low to moderate shrink-swell potential.	Seasonal high water table; subject to flooding.	Seasonal high water table; subject to flooding; moderately slow permeability.
Sciotoville (ScA, ScB2)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; low to moderate shrink-swell potential.	Subject to frost heave.	Slowly permeable fragipan at a depth of 18 to 30 inches.
Stendal (Sd)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Seasonal high water table; subject to flooding.	Subject to flooding; seasonal high water table.
Tilsit (TlA, TlB2)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Poor: fair to good stability and compaction; medium to high compressibility; low shrink-swell potential.	Subject to frost heave.	Not needed in most places; slowly permeable fragipan at a depth of 18 to 30 inches.
Uniontown (UnB2, UnC3)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Poor: fair to good stability and compaction; medium to high compressibility; moderate to high shrink-swell potential.	Plasticity; high shrink-swell potential.	Not needed in most places.
Wakeland (Wa)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Seasonal high water table; subject to flooding.	Subject to flooding; seasonal high water table.

See footnotes at end of table.

interpretations—Continued

Farm ponds		Terraces and diversions	Grassed waterways	Soil features affecting use of the soils for foundations for low buildings [4]	Degree of limitation of the soils for disposal fields for septic tanks
Reservoir areas	Embankments				
Not suitable; some layers of substratum are rapidly permeable; rapid seepage.	Subsoil. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping. Substratum. Poor to fair stability; fair compaction; moderate to high permeability when compacted; slight to very slight compressibility; poor resistance to piping.	Irregular slopes	Soil features favorable.	Medium to high shear strength; low compressibility; low shrink-swell potential.	Slight: 2 to 6 percent slopes. Severe: 12 to 25 percent slopes.
Slow seepage; subject to flooding; seasonal high water table.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; slow to moderate permeability when compacted; good to poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Low to moderate shrink-swell potential; medium to high compressibility; soft when wet; subject to flooding; seasonal high water table.	Severe: subject to flooding; seasonal high water table.
Moderate seepage	Subsoil and substratum. Fair to poor stability and compaction; moderate to slow permeability when compacted; medium compressibility; good to poor resistance to piping.	Slowly permeable fragipan at a depth of 18 to 30 inches.	Slowly permeable fragipan at a depth of 18 to 30 inches.	Medium to high compressibility; low to moderate shrink-swell potential.	Severe: slowly permeable fragipan.
Seasonal high water table; pervious substratum; subject to flooding.	Subsoil and substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Medium compressibility; soft when wet; seasonal high water table; subject to flooding.	Severe: subject to flooding; seasonal high water table.
Moderate seepage below fragipan.	Subsoil and substratum. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping.	Slowly permeable fragipan at a depth of 18 to 30 inches.	Slowly permeable fragipan at a depth of 18 to 30 inches.	Low shrink-swell potential; medium to high compressibility.	Severe: slowly permeable fragipan at a depth of 18 to 30 inches.
Soil features favorable.	Subsoil and substratum. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping.	Not needed in most places; areas too small, slopes too short.	Soil features favorable.	Moderate to high shrink-swell potential; medium to high compressibility.	Severe: moderately slow permeability.
Seasonal high water table; pervious substratum.	Subsoil and substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Low shrink-swell potential; medium compressibility; seasonal high water table; subject to flooding.	Severe: subject to flooding; seasonal high water table.

TABLE 6.—*Engineering*

Soil series and map symbols	Suitability as a source of—			Highway location [3]	Agricultural drainage
	Topsoil (surface layer)	Sand and gravel [1]	Material for highway subgrade [2]		
Weinbach (WeA, WeB2)	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; medium compressibility; moderate to low shrink-swell potential.	Seasonal high water table; subject to frost heave and occasional flooding.	Slowly permeable fragipan at a depth of about 23 inches; seasonal high water table; subject to occasional flooding.
Wellston (WlB2, W B3, WlC2, WlC3, WlD, WlD3, WlE, WlE3, WmE). For Gilpin part of WmE, see Gilpin series. For Muskingum part, see Muskingum series.	Fair: low organic-matter content.	Not suitable	Subsoil and substratum. Fair: poor stability and compaction; medium compressibility; low to moderate shrink-swell potential; bedrock at a depth of 30 to 60 inches.	Bedrock at a depth of 30 to 60 inches; subject to frost heave; cuts and fills needed.	Not needed; well drained.
Wheeling (WnA, WnB2, WnC2, WnC3).	Fair: low organic-matter content.	Not suitable	Subsoil. Poor: fair to good stability and compaction; medium to high compressibility; moderate shrink-swell potential. Substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Soil features favorable.	Not needed; well drained.
Woodmere (Wo)	Good: medium organic-matter content.	Not suitable	Subsoil and substratum. Fair to poor: fair to poor stability and compaction; medium compressibility; low to moderate shrink-swell potential.	Subject to flooding	Not needed in most places; subject to flooding.
Zanesville (ZaB2, ZaB3, ZaC2, ZaC3, ZaD, ZaD3).	Fair: low organic-matter content.	Not suitable	Subsoil. Poor: fair to good stability and compaction; medium to high compressibility; low shrink-swell potential. Substratum. Fair: poor stability and compaction; medium compressibility; low shrink-swell potential.	Subject to frost heave; cuts and and fills needed in many places; exposed cuts subject to erosion.	Not needed; well drained.

[1] The rating applies to the soil material at a depth of 5 to 7 feet. Test pits should be dug because the depth to sand or sand and gravel varies, even among soils of the same series.

[2] The rating is based on the performance of the soil material when it is used as borrow for subgrade. If the subsoil and the substratum are made up of contrasting material, they are rated individually.

interpretations—Continued

Farm ponds: Reservoir areas	Farm ponds: Embankments	Terraces and diversions	Grassed waterways	Soil features affecting use of the soils for foundations for low buildings [4]	Degree of limitation of the soils for disposal fields for septic tanks
Seasonal high water table; slow seepage; subject to occasional flooding.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; moderate to slow permeability when compacted; poor to good resistance to piping.	Slowly permeable fragipan at a depth of about 23 inches.	Slowly permeable fragipan at a depth of about 23 inches.	Low to moderate shrink-swell potential; medium compressibility; seasonal high water table; subject to occasional flooding.	Severe: slow permeability; subject to occasional flooding; seasonal high water table.
Moderate seepage; bedrock at a depth of 30 to 60 inches.	Subsoil and substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Bedrock at a depth of 30 to to 60 inches.	Bedrock at a depth of 30 to 60 inches	Low to moderate shrink-swell potential; medium compressibility; bedrock at a depth of 30 to 60 inches.	Severe: bedrock at a depth of 30 to 60 inches.
Moderate seepage	Subsoil. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping. Substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Soil features favorable.	Soil features favorable.	Medium compressibility.	Slight: 0 to 6 percent slopes. Moderate: 6 to 12 percent slopes.
Moderate to rapid seepage; subject to flooding.	Subsoil and substratum. Fair to poor stability and compaction; medium compressibility; moderate to slow permeability when compacted; good to poor resistance to piping.	Not needed; nearly level.	Not needed; nearly level.	Low to moderate shrink-swell potential; medium compressibility; subject to flooding.	Severe: subject to flooding.
Moderate seepage below fragipan.	Subsoil. Fair to good stability and compaction; medium to high compressibility; slow permeability when compacted; good resistance to piping. Substratum. Poor stability and compaction; medium compressibility; moderate permeability when compacted; poor resistance to piping.	Slowly permeable fragipan at a depth of 24 to 34 inches.	Slowly permeable fragipan at a depth of 24 to 34 inches.	Low shrink-swell potential; medium compressibility.	Severe: slowly permeable fragipan at a depth of 24 to 34 inches.

[3] The soil features enumerated are those that affect overall performance of the soil when used as locations for highways. The evaluation relates to the entire profile, undisturbed and without artificial drainage.

[4] The substratum is the part of the soil evaluated, because it is the substratum that ordinarily provides the base for building foundations. The features described are those that affect capacity for supporting buildings up to three stories in height.

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Rainfall, on the average, is 45.2 inches annually. It is well distributed throughout the year, but is slightly heavier in spring and summer than in fall and winter. The plentiful rainfall has leached plant nutrients from the surface soil and has prevented accumulation of free calcium carbonate.

Climatic forces act directly upon rocks to form the parent material from which soils develop, but many of the more important soil characteristics are brought about indirectly through the influence of climate on living organisms. Without the changes brought about by the action of plants and animals, the soils would consist of residual or transported material derived from weathered rock, although some might have definite layers formed by the addition of alluvial or colluvial materials or by differential weathering or leaching.

Climate, acting alone on parent material, would be largely destructive; rain and melting snow would wash the soluble material out. The processes of climate become constructive only when combined with the activities of plants and animals. Plants draw nutrients from the lower part of the soil; then, when the plants die, the nutrients are restored in varying degrees to the soil by the accumulation of decaying vegetation in the upper part. In Perry County the climate is such that leaching progresses faster than replacement of plant nutrients. This accounts for the fact that most of the soils are strongly weathered, leached, acid, and low in fertility.

Plant and animal life

Higher plants, micro-organisms, earthworms, and other forms of life that live on and in the soil contribute to soil formation. The higher plants bring moisture and plant nutrients from the lower part of the profile to the upper part and return organic matter to the soil. Bacteria and fungi cause dead vegetation to decompose into organic matter and to be incorporated into the soil.

The native vegetation of Perry County consisted largely of hardwood trees. Trees return a comparatively small amount of organic matter to the soils. In uncleared parts of the uplands, the surface is covered with a thin layer of litter and leaf mold and the topmost inch or two of soil contains a small amount of organic matter. In small areas in the county, the native vegetation consisted of swamp grasses, sedges, and water-tolerant trees. The soils in these areas were covered with water much of the year, and the organic matter decayed slowly, and some accumulation of organic matter resulted. Soils of the Patton series are examples.

The vegetation is fairly uniform throughout the county. Major differences among the soils, therefore, cannot be explained on the basis of differences in vegetation. Some comparatively minor variations in the vegetation are associated with different soils, but these variations are probably a result, not a cause, of differences among the soils.

Relief

Relief influences soil formation through its effect on drainage, runoff, leaching, and normal and accelerated erosion.

The relief (fig. 14) in Perry County ranges from nearly level on bottom lands, terraces, and upland flats to very steep on breaks. Most of the county has been well dissected by weathering and streamcutting. The lowest point, at the place just west of Troy where the Ohio River leaves the county, is 380 feet above sea level. The highest point, at Buzzard Roost Fire Tower near the place where the Ohio River meets the eastern county line, is 875 feet above sea level.

Steep soils are not so well developed as level or sloping soils, even though the parent material was of the same kind. The weaker development of steep soils results from more rapid geologic erosion, less leaching, and lack of sufficient soil moisture to support a vigorous growth of plants.

The soils of the Zanesville-Johnsburg-Tilsit catena are examples of soils that show the effects of variation in relief on development of soils that formed in the same kind of parent material. All of these soils formed in a mantle of loess overlying sandstone and residuum weathered from shale. The Zanesville soils, which are sloping to strongly sloping, are well-drained and moderately permeable. They are brown to dark brown. The Johnsburg soils, which are level to nearly level, are somewhat poorly drained and slowly permeable. They are gray and mottled. The Tilsit soils, which are gently sloping, are moderately well drained and moderately slowly permeable. They are yellowish brown and have some mottling in the subsoil.

Time

Significant differences among the soils of Perry County result from differences in the length of time the parent material has been undergoing the processes of soil formation.

A soil that has well-developed A and B horizons produced by the natural processes of soil formation is a mature soil; one that has little or no horizon differentiation is an immature soil. Generally, the longer the period of soil formation, the greater the degree of horizon differentiation. The effect of time, however, is modified by relief and by the nature of the parent material. Steep topography and parent material that is extremely resistant to weathering retard the development of horizons.

Most of the soils on the smoother parts of the uplands and on the older stream terraces are mature, that is, they have well-defined profiles. The soils on first bottoms and those that formed in local alluvium and colluvium are immature because the parent material is young and new material is deposited periodically. Steep soils are also likely to be immature because geologic erosion removes soil material about as fast as it accumulates and because more water is lost through runoff and less percolates through the soil.

The oldest soils in Perry County are those that developed in residuum weathered from sandstone, shale, siltstone, and limestone. The soils that developed in lacustrine materials—those of the Markland, Uniontown, Henshaw, McGary, and Patton series—and those that developed in sandy eolian material of Wisconsin age are not so deeply leached nor so thoroughly leached as the soils that developed in residuum. The young soils are the shallow soils that developed in residuum and that generally have such steep slopes that erosion nearly keeps pace with soil formation (those of the Corydon and Mus-

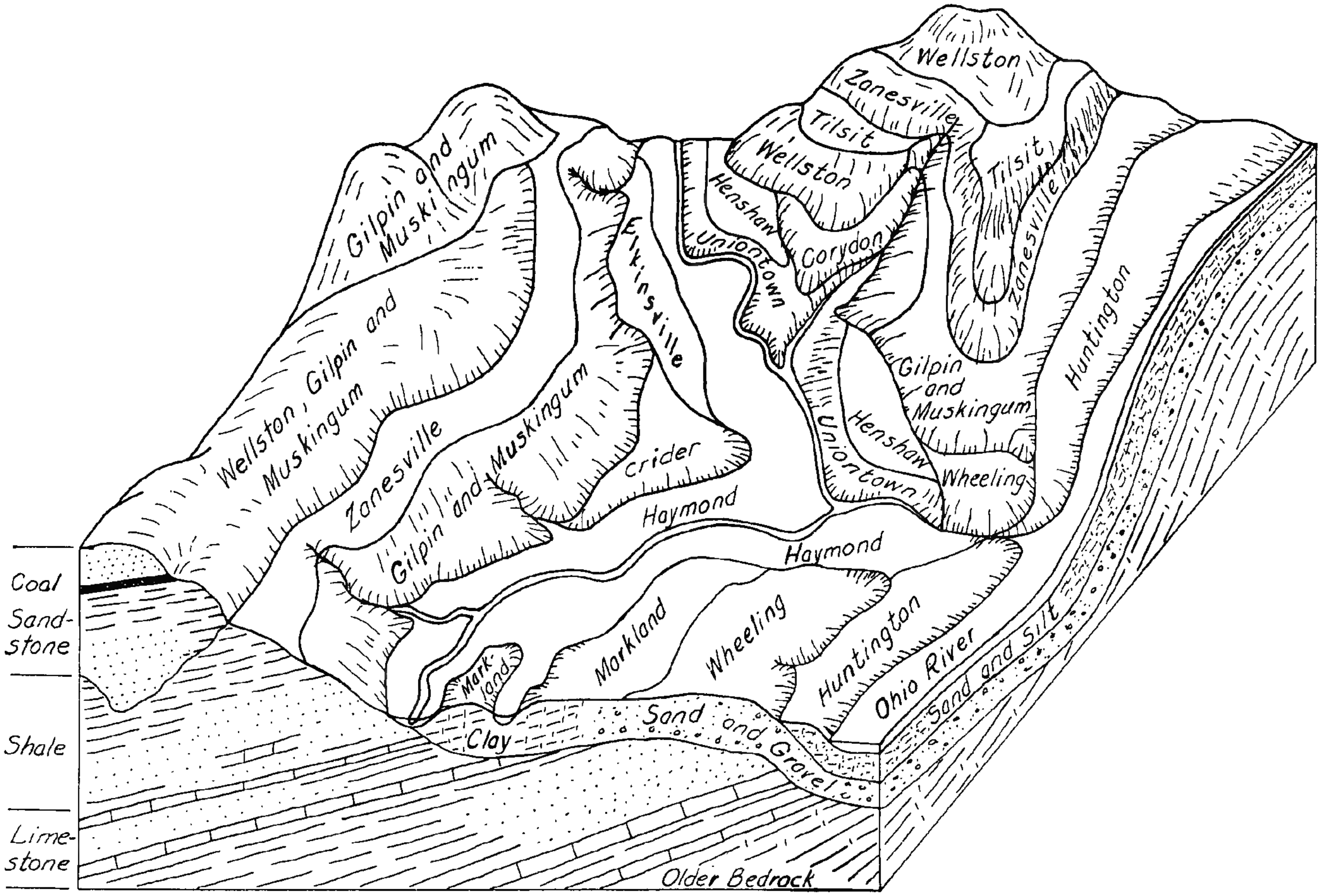

Figure 14.—**Relationship of relief and geologic strata to certain of the soil series represented in Perry County. The vertical scale is greatly exaggerated.**

kingum series), and bottom-land soils on which fresh material is deposited periodically.

Processes of Soil Formation

Several processes were involved in the formation of the soils of this county. These processes are the accumulation of organic matter; the solution, transfer, and reprecipitation of calcium carbonates and bases; the liberation, reduction, and transfer of iron; and the formation and translocation of silicate clay minerals. In most soils, more than one of these processes have been active in horizon differentiation.

The accumulation of organic matter in the upper part of the profile is important in the formation of an A1 horizon. Generally, soils that contain much organic matter have a thick, dark-colored surface horizon.

Carbonates and bases have been leached from the upper horizons of nearly all of the soils of this county. This leaching is generally believed to precede the translocation of silicate clay minerals.

Clay particles accumulate in pores and form films on the surface along which water moves. Leaching of bases and the translocation of silicate clays are among the more important processes in horizon differentiation in the soils of this county. Soils of the Zanesville series are representative of soils in which translocated silicate clays have accumulated in the B2t horizon in the form of clay films.

The reduction and transfer of iron, or gleying, is evident in some of the poorly drained soils, such as those of the McGary series. The gray color of the subsoil indicates the reduction and loss of iron. Mottles, which occur in some horizons, indicate segregation of iron.

Classification of the Soils

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*3*) and later revised (*9*). The system currently used was adopted for general use by the National Cooperative Soil Survey in 1965 and supplemented in March 1967 (*10*). This system is under continual study, and readers interested in the development of the system should refer to the latest literature available (*7*).

Table 7 shows the classification of each of the soil series represented in Perry County according to the present system, and also the great soil group according to the 1938 system.

TABLE 7.—*Classification of soil series of Perry County*

Series	Family	Subgroup and great group	Order	Great soil group (1938 classification)
Alford	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Bartle	Fine-silty, mixed, mesic	Aeric Fragiaqualfs	Alfisols	Gray-Brown Podzolic soils.
Bruno	Sandy, mixed, thermic	Typic Udifluvents	Entisols	Alluvial soils.
Corydon	Clayey, mixed, mesic	Lithic Argiudolls	Mollisols	Gray-Brown Podzolic soils.
Crider [1]	Fine-silty, mixed, mesic	Ultic Paleudalfs	Alfisols	Red-Yellow Podzolic soils.
Cuba	Fine-silty, mixed, mesic	Fluventic Dystrochrepts	Inceptisols	Alluvial soils.
Elkinsville	Fine-loamy, mixed, mesic	Ultic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Gilpin	Fine-loamy, mixed, mesic	Typic Hapludults	Ultisols	Red-Yellow Podzolic soils.
Ginat	Fine-silty, mixed, mesic	Typic Fragiaqualfs	Alfisols	Planosols.
Haymond	Coarse-silty, mixed, mesic	Dystric Fluventic Eutrochrepts.	Inceptisols	Alluvial soils.
Henshaw	Fine-silty, mixed, mesic	Aquic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Huntington	Fine-silty, mixed, mesic	Fluventic Hapludolls	Mollisols	Alluvial soils.
Johnsburg	Fine-silty, mixed, mesic	Aquic Fragiudults	Ultisols	Planosols.
Lindside	Fine-silty, mixed, mesic	Aquic-Fluventic Eutrochrepts.	Inceptisols	Alluvial soils.
Markland	Fine, mixed, mesic	Typic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
McGary	Fine, mixed, mesic	Aeric Ochraqualfs	Alfisols	Gray-Brown Podzolic soils.
Muskingum	Fine-loamy, mixed, mesic	Typic Dystrochrepts	Inceptisols	Sols Bruns Acides.
Newark	Fine-silty, mixed, nonacid, mesic	Aeric-Fluventic Haplaquepts.	Inceptisols	Alluvial soils.
Patton	Fine-silty, mixed, noncalcareous, mesic	Typic Haplaquolls	Mollisols	Humic Gley soils.
Pekin	Fine-silty, mixed, mesic	Aqueptic Fragiudalfs	Alfisols	Gray-Brown Podzolic soils.
Philo	Coarse-loamy, mixed, mesic	Aquic-Fluventic Dystrochrepts.	Inceptisols	Alluvial soils.
Pope	Coarse-loamy, mixed, mesic	Fluventic Dystrochrepts	Inceptisols	Alluvial soils.
Princeton	Fine-loamy, mixed, mesic	Typic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Rahm	Fine-silty, mixed, mesic	Aquic-Fluventic Eutrochrepts.	Inceptisols	Alluvial soils.
Sciotoville	Fine-loamy, mixed, mesic	Aqueptic Fragiudalfs	Alfisols	Gray-Brown Podzolic soils.
Stendal	Fine-silty, mixed, acid, mesic	Aeric-Fluventic Haplaquepts.	Inceptisols	Alluvial soils.
Tilsit	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols	Red-Yellow Podzolic soils.
Uniontown	Fine-silty, mixed, mesic	Typic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Wakeland	Coarse-silty, mixed, nonacid, mesic	Aeric-Fluventic Haplaquepts.	Inceptisols	Alluvial soils.
Weinbach	Fine-silty, mixed, mesic	Aeric Fragiaqualfs	Alfisols	Planosols.
Wellston	Fine-silty, mixed, mesic	Ultic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Wheeling	Fine-loamy, mixed, mesic	Ultic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Woodmere	Fine-silty, mixed, mesic	Dystric Fluventic Eutrochrepts.	Inceptisols	Alluvial soils.
Zanesville	Fine-silty, mixed, mesic	Typic Fragiudults	Ultisols	Red-Yellow Podzolic soils.

[1] In this county Crider soils are dominantly Typic Hapludalfs. A few areas are Ultic Paleudalfs.

The current system defines classes in terms of observable or measurable properties of soils. The properties chosen are primarily those that permit the grouping of soils that are similar in genesis. The classification is designed to encompass all soils. It has six categories. Beginning with the most inclusive, they are the order, the suborder, the great group, the subgroup, the family, and the series. They are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized in the current system: Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, Entisols and Histosols, occur in many different climates. Five of the ten soil orders are represented in Perry County: Entisols, Inceptisols, Mollisols, Alfisols, and Ultisols.

SUBORDER.—Each order is divided into suborders, primarily on the basis of characteristics that seem to produce classes having genetic similarity. Mainly, these are characteristics that reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. The climatic range is narrower than that of the orders.

GREAT GROUP.—Each suborder is divided into great groups, on the basis of uniformity in the kinds and sequence of major horizons and similarity of the significant features of corresponding horizons. The horizons considered are those in which clay, iron, or humus have accumulated and those that have pans that interfere with the growth of roots or the movement of water. The features selected are the self-mulching properties of clays, soil temperature, chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like.

SUBGROUP.—Each group is divided into subgroups, one representing the central (typic) segment of the group, and other groups, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups

may also be made in those instances where soil properties intergrade outside the range of any other great group, suborder, or order.

FAMILY.—Families are established within a subgroup primarily on the basis of properties that affect the growth of plants or the behavior of soils in engineering use. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES.—The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile.

General Nature of the County

This section gives general facts about Perry County. It briefly discusses drainage, physiography, and relief, gives information about industries and transportation, and gives a short resume of the climate of the county.

Drainage, Physiography, and Relief

The county is drained mainly by several small watersheds that empty into the Ohio River, which forms the southern boundary and much of the eastern boundary of the county. The topography of the county is mainly steep. The ridgetops are used for crops and pasture, the hillsides are wooded or are used for pasture, and the bottom lands are farmed, used for pasture, or left idle, depending on the suitability of the soils. The narrow bottom lands along the Ohio River are flooded frequently in winter and early in spring.

The Anderson River, which forms much of the western boundary of the county, drains about 107,000 acres. It empties into the Ohio, half a mile west of Troy. Middle Fork, a major tributary, drains about 64,400 acres. The Anderson River watershed has steep hills and fairly wide bottom lands. Flooding comes from headwaters and from backwaters of the Ohio River.

Deer Creek drains about 28,000 acres in the south-central part of the county. It empties into the Ohio River about 4 miles east of Cannelton, near the junction of State Highways 66 and 166. The Deer Creek watershed is very steep. Much of it is owned by the Federal Government and administered by the Forest Service. The uplands and the slopes are heavily wooded. The bottom lands are narrow and are flooded yearly from headwaters and, along the lower reaches, by backwaters of the Ohio River. Near the outlet into the Ohio, the valley widens and there are terraces along each side. Construction of a navigation dam at Cannelton will affect drainage at the lower end of the watershed.

The southern part of the county is drained by small watersheds that drain directly into the Ohio River.

Poison Creek drains about 15,000 acres in the southeastern part of the county. It empties into the Ohio River about 3½ miles north of Rome. The Poison Creek watershed is very similar to that of Deer Creek. Much of it is owned by the Federal Government. It is heavily timbered.

Oil Creek drains about 48,000 acres in the northeastern part of the county. It empties into the Ohio River about 1 mile north of Derby. The Oil Creek watershed is very similar to those of Deer Creek and Poison Creek.

The northeastern corner of the county drains northward and eastward through Crawford County and into the Little Blue River.

Industries and Transportation

According to the 1960 census, 55 percent of the farmers in the county worked part time at jobs away from the farm. About 39 percent worked more than 3 months out of the year. The number of farmers working off the farm steadily increases.

The county has several industries, which provide employment for about 3,500 people. Among these are four furniture factories, a plant for production of television and radio tubes, a shipyard where river barges are built, a factory where vitrified clay pipes are made, a commercial filter plant, a factory where metal safes are produced, an aluminum foundry, and a limestone quarry. In addition, there are many small sawmills throughout the county that provide lumber to furniture manufacturers, builders, processors of railroad ties, and manufacturers of industrial shipping pallets. All of these industries provide employment.

The county is well served by hard-surfaced Federal and State highways. In addition, about 800 miles of county roads provide farm-to-market facilities. Construction of the toll bridge at Cannelton will open a major north-south route through the county, and completion of Interstate Highway 64, which will cross the northern part of the county in an east-west direction when completed, will further improve access to major cities and markets.

One railroad branch line runs through the Troy-Tell City-Cannelton area.

The Ohio River is used to transport limestone quarried in the county.

Climate [6]

The temperature in Perry County varies widely from summer to winter, but precipitation is evenly distributed throughout the year. In an average year no single month has less than 2 inches of precipitation. Nevertheless, droughty conditions sometimes develop in summer, when exaporation exceeds rainfall, particularly in soils that have low moisture-holding capacity.

Table 8 shows representative temperature and precipitation data.

Temperatures in the past 25 years have ranged from a record low of −12° F., in January, to a record high of 106°, in September. Freezing temperatures have never been recorded in the months of May through August. A subzero temperature occurs about once a year. Temperatures fall below 32° on about 96 days a year.

Snowfall at Tell City, along the Ohio River, averages 10.5 inches a year, but in some years very little snow falls. On the other hand, as much as 20 inches has fallen in a single month.

[6] By LAWRENCE A. SCHAAL, State climatologist, U.S. Weather Bureau.

TABLE 8.—*Temperature and precipitation data*

[Data from Tell City. Most statistics cover a period of 25 years]

Month	Temperature							Precipitation					Mean num[ber]	
	Record low	Mean					Record high	1 year in 5 will have less than—	Mean	1 year in 5 will have more than—	Snow or sleet		Precipitation of 0.10 inch or more	Maxim[um]
		Monthly minimum	Daily minimum	Monthly mean	Daily maximum	Monthly maximum					Mean	Maximum monthly		90° and above
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Days*	*Days*
January	−12	6	26	35	44	65	79	2. 3	4. 2	6. 0	3. 1	9	6	0
February	−8	11	29	38	48	68	77	2. 0	4. 0	6. 3	2. 9	12	8	0
March	1	18	35	45	56	77	88	2. 1	4. 8	6. 1	1. 9	20	6	0
April	26	30	45	57	68	85	91	2. 1	4. 0	5. 4	(2)	(2)	7	(1)
May	34	40	55	67	79	90	97	2. 5	4. 6	6. 9	0	0	8	3
June	42	50	64	76	87	97	102	2. 0	4. 4	6. 4	0	0	7	12
July	47	56	67	79	90	98	105	2. 0	3. 6	5. 5	0	0	7	18
August	46	54	66	78	90	98	104	1. 4	3. 5	4. 8	0	0	5	17
September	31	43	58	71	84	96	106	1. 4	3. 2	4. 5	0	0	4	8
October	21	31	47	61	74	89	96	1. 1	2. 3	4. 2	0	0	5	1
November	0	19	36	47	57	78	86	1. 4	3. 5	5. 3	. 7	8	6	0
December	3	11	29	38	46	65	74	1. 7	3. 1	3. 9	1. 9	9	5	0
Year	−12	31	46	58	69	84	106	39. 1	45. 2	50. 2	10. 5	20	74	59

[1] Less than half a day. [2] Trace.

Relative humidity and other meteorological data are not recorded in this county, but certain information can be derived from data from nearby areas. More often than not, relative humidity is nearly 100 percent at the time of the daily minimum temperature, usually just before sunrise or when there is fog. If this temperature is sustained for a period of time during the night, heavy dew or frost accumulates. Although the dew or frost may delay some early-morning farming operations, it may also be a welcome source of moisture and may slow down the loss of soil moisture. The relative humidity declines as the day warms, and relative humidity in the forties or fifties is common on sunny days. Generally, it falls after the passing of a cold front and rises when the wind is from the south.

The average date of the last frost in spring ranges from about April 10 along the Ohio River to about April 20 in the higher, more rugged terrain of the northern part of Perry County. The average date of the first freezing temperature in fall is about October 30 along the Ohio River and a little earlier, about October 20, in the northern part of Perry County.

Winds seldom reach a high velocity in this county. Scattered thunderstorms account for the erratic precipitation in summer. Only two tornadoes have been reported in a 48-year period. Surface winds are from the south most of the time, but for a couple of months in winter they are from the north.

Some of the variations in the climate from one part of the county to another result from differences in elevation, direction of slope, and proximity to streams.

Recreation

The soils and landscape of Perry County are suitable for a wide variety of recreational facilities. The wooded hills and scenic valleys, the rivers and streams attract hikers, campers, fishermen, hunters, and water sportsmen. The many watersheds in the county have potential for impoundment of water for many recreational purposes.

Several recreational facilities have already been established, and many more are being developed or are in the planning stage. A program that is expected to create sites suitable for marinas and for boating and fishing on the Ohio River is in progress. The Cannelton Locks and Dam project is part of this program.

More than 5 million people live within a radius of 200 miles of Perry County. Interstate Highway 64, which will cross the northern part of the county in an east-west direction when completed, will increase the number of travelers through the area. The opening of the highway is expected to stimulate both private and public investment in recreational enterprises.

The Outdoor Recreation Resources Review Commission predicts that outdoor recreational activities will greatly increase in the latter half of the twentieth century (*4*). The Commission recommends that land-use planning include planning for outdoor recreation.

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Glossary

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available moisture capacity. The approximate amount of capillary water in the soil when wet to field capacity. When the soil is "air dry," this amount of water will wet the soil material described to a depth of 1 inch without deeper penetration. The capacity of a particular horizon to deliver water to plant roots depends on whether or not the roots can reach the horizon.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a wire when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. When dry, this layer is seemingly cemented, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon. The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon. The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of the following: soluble salts, clay, or sesquioxides (iron and aluminum oxides).

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of change from the A horizon to the C horizon. It has (1) distinctive characteristics caused by accumulation of clay, sesquioxides, humus, or some combination of these; (2) prismatic or blocky structure; (3) redder or stronger colors than the A horizon; or (4) some combination of these. The A and B horizons combined are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon. The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Loess. A fine-grained eolian deposit consisting dominantly of silt-size particles.

Morphology, soil. The makeup of the soil, including the texture, structure, consistence, color, and other physical, mineralogical, and biological properties of the various horizons of the soil profile.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common* and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Parent material (soil). The disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow*, *slow*, *moderately slow*, *moderate*, *moderately rapid*, *rapid*, and *very rapid*.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Mildly alkaline	7.4–7.8
Very strongly acid	4.5–5.0	Moderately alkaline	7.9–8.4
Strongly acid	5.1–5.5	Strongly alkaline	8.5–9.0
Medium acid	5.6–6.0	Very strongly alkaline	9.1 and higher
Slightly acid	6.1–6.5		
Neutral	6.6–7.3		

Slope. The number of feet of fall per 100 feet of horizontal distance. Expressed as—

Nearly level	0 to 2 percent
Gently sloping	2 to 6 percent
Sloping	6 to 12 percent
Strongly sloping	12 to 18 percent
Moderately steep	18 to 25 percent
Steep	25 to 35 percent
Very steep	35 percent or more

Solum, soil. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil is made up of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Substratum. Any layer beneath the solum, or true soil; the C horizon.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

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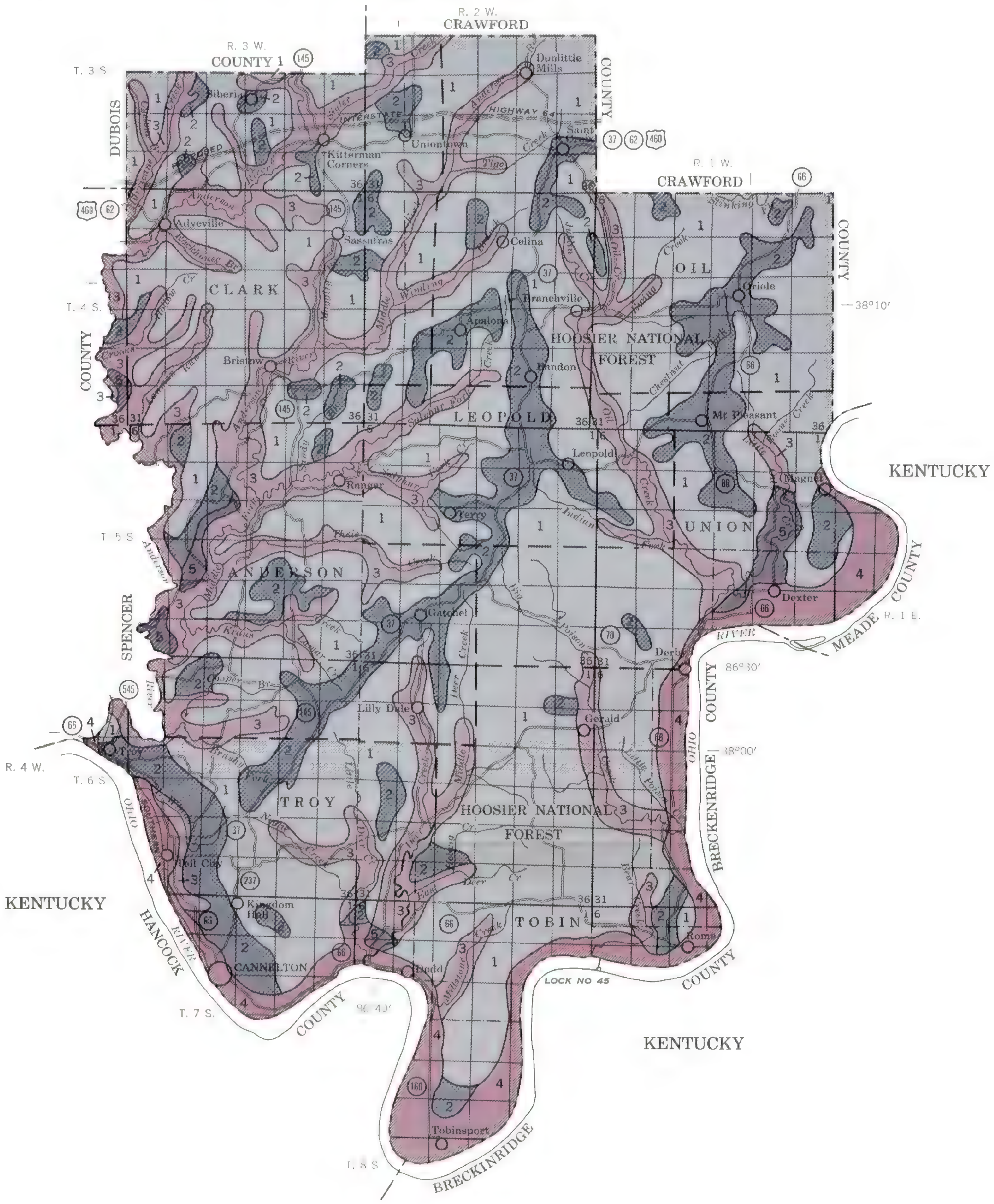

SOIL ASSOCIATIONS

1 — Gilpin–Muskingum–Wellston association: Moderately deep and deep, well-drained, medium-textured, gently sloping to very steep soils on uplands

2 — Zanesville–Tilsit association: Deep, well drained and moderately well drained, medium-textured, nearly level to strongly sloping soils that have a brittle, slowly permeable or very slowly permeable fragipan in the lower part of the subsoil; on uplands

3 — Haymond–Pope–Elkinsville association: Deep, well-drained, medium-textured, nearly level to sloping soils on flood plains and old stream terraces

4 — Wheeling–Huntington–Weinbach association: Deep, well-drained to somewhat poorly drained, medium-textured, nearly level to sloping soils on stream terraces and flood plains

5 — Markland–Henshaw–Uniontown association: Deep, well-drained to somewhat poorly drained, medium-textured, nearly level to steep soils on stream terraces

August 1968

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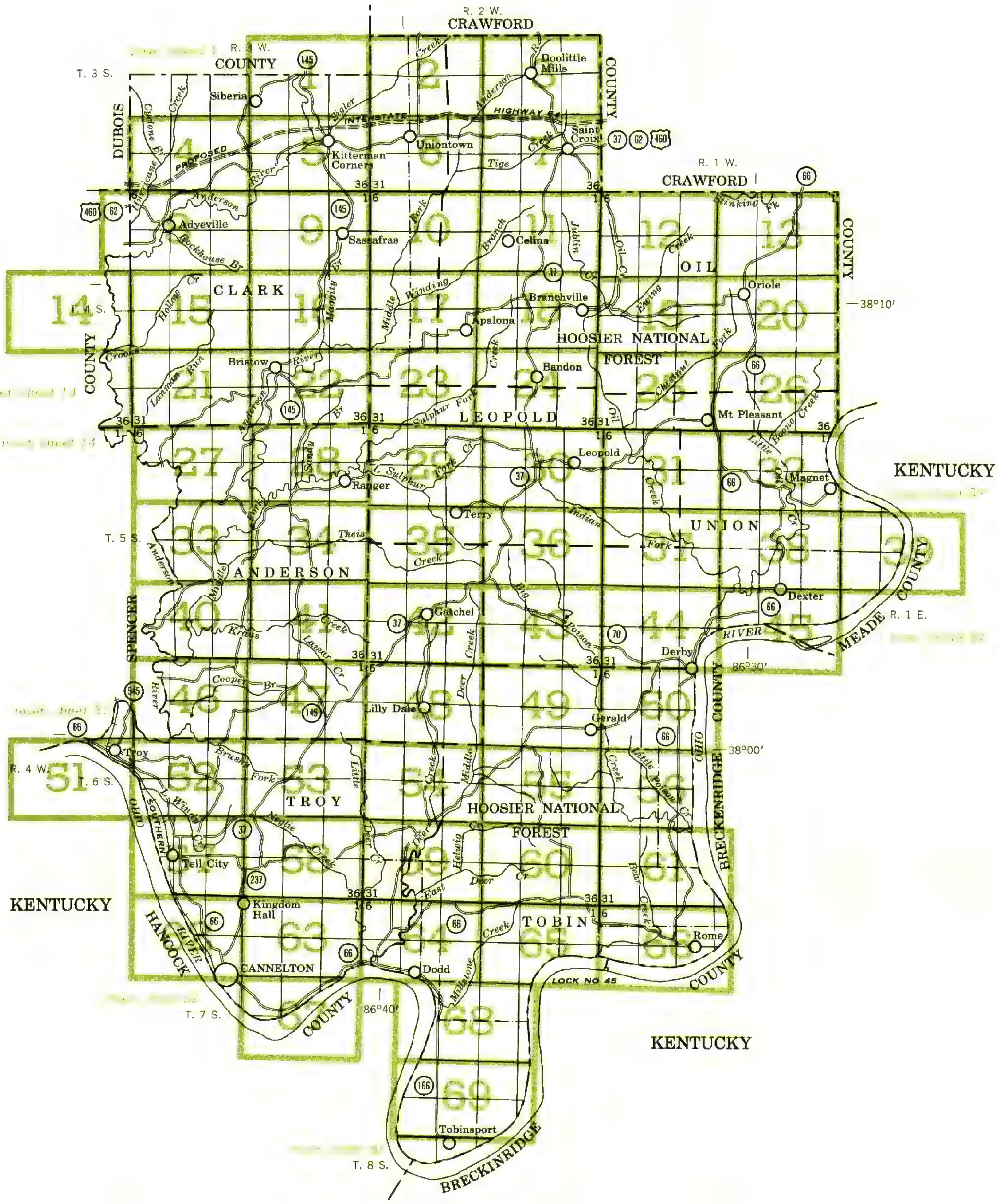
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE AND FOREST SERVICE
in cooperation with
PURDUE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
PERRY COUNTY, INDIANA

SCALE IN MILES
1 0 1 2 3 4



INDEX TO MAP SHEETS

PERRY COUNTY, INDIANA

SCALE IN MILES

1 0 1 2 3 4

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter A, B, C, D, E, F, or G, shows the slope. Most symbols without a slope letter are those of nearly level soils or land types, but some are for land types that have a considerable range of slope. The number, 2 or 3, in the symbol indicates that the soil is eroded or severely eroded.

SYMBOL	NAME
AfB2	Alford silt loam, 2 to 6 percent slopes, eroded
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded
AfC3	Alford silt loam, 6 to 12 percent slopes, severely eroded
AfD	Alford silt loam, 12 to 18 percent slopes
AfD3	Alford silt loam, 12 to 18 percent slopes, severely eroded
AfE3	Alford silt loam, 18 to 25 percent slopes, severely eroded
BaA	Bartle silt loam, 0 to 3 percent slopes
Br	Bruno fine sandy loam
CoE	Corydon stony silt loam, 18 to 25 percent slopes
CoG	Corydon stony silt loam, 25 to 70 percent slopes
CrB2	Crider silt loam, 2 to 6 percent slopes, eroded
CrD2	Crider silt loam, 12 to 18 percent slopes, eroded
CsC3	Crider silty clay loam, 6 to 12 percent slopes, severely eroded
CsD3	Crider silty clay loam, 12 to 18 percent slopes, severely eroded
Cu	Cuba silt loam
EkA	Elkinsville silt loam, 0 to 2 percent slopes
EkB2	Elkinsville silt loam, 2 to 6 percent slopes, eroded
EkC3	Elkinsville silt loam, 6 to 12 percent slopes, severely eroded
GmF	Gilpin Wellston Muskingum association, 25 to 35 percent slopes
Gn	Ginat silt loam
Gu	Gullied land
Ha	Haymond silt loam
HeA	Henshaw silt loam, 0 to 2 percent slopes
HeB2	Henshaw silt loam, 2 to 6 percent slopes, eroded
Hu	Huntington silt loam
JoA	Johnsburg silt loam, 0 to 2 percent slopes
JoB2	Johnsburg silt loam, 2 to 6 percent slopes, eroded
Ln	Lindside silt loam
MaD2	Markland silt loam, 12 to 18 percent slopes, eroded
MaE2	Markland silt loam, 18 to 25 percent slopes, eroded
MkC3	Markland silty clay loam, 6 to 12 percent slopes, severely eroded
MkD3	Markland silty clay loam, 12 to 18 percent slopes, severely eroded
MkE3	Markland silty clay loam, 18 to 25 percent slopes, severely eroded
MkF3	Markland silty clay loam, 25 to 35 percent slopes, severely eroded
Mr	McGary silt loam
MsG	Muskingum Gilpin association, 35 to 70 percent slopes
Ne	Newark silt loam
Pa	Patton silty clay loam
PeA	Pekin silt loam, 0 to 2 percent slopes
PeB2	Pekin silt loam, 2 to 6 percent slopes, eroded
Ph	Philo silt loam
Po	Pope loam, channery subsoil variant
PrB2	Princeton fine sandy loam, 2 to 6 percent slopes, eroded
PsE3	Princeton loam, 12 to 25 percent slopes, severely eroded

SYMBOL	NAME
Ra	Rahm silt loam
ScA	Sciotoville silt loam, 0 to 2 percent slopes
ScB2	Sciotoville silt loam, 2 to 6 percent slopes, eroded
Sd	Stendal silt loam
St	Strip mines
Te	Terrace escarpments
TlA	Tilsit silt loam, 0 to 2 percent slopes
TlB2	Tilsit silt loam, 2 to 6 percent slopes, eroded
UnB2	Uniontown silt loam, 2 to 6 percent slopes, eroded
UnC3	Uniontown silt loam, 6 to 12 percent slopes, severely eroded
Wa	Wakeland silt loam
WeA	Weinbach silt loam, 0 to 2 percent slopes
WeB2	Weinbach silt loam, 2 to 4 percent slopes, eroded
WlB2	Wellston silt loam, 2 to 6 percent slopes, eroded
WlB3	Wellston silt loam, 2 to 6 percent slopes, severely eroded
WlC2	Wellston silt loam, 6 to 12 percent slopes, eroded
WlC3	Wellston silt loam, 6 to 12 percent slopes, severely eroded
WlD	Wellston silt loam, 12 to 18 percent slopes
WlD3	Wellston silt loam, 12 to 18 percent slopes, severely eroded
WlE	Wellston silt loam, 18 to 25 percent slopes
WlE3	Wellston silt loam, 18 to 25 percent slopes, severely eroded
WmE	Wellston–Gilpin–Muskingum association, 18 to 25 percent slopes
WnA	Wheeling silt loam, 0 to 2 percent slopes
WnB2	Wheeling silt loam, 2 to 6 percent slopes, eroded
WnC2	Wheeling silt loam, 6 to 12 percent slopes, eroded
WnC3	Wheeling silt loam, 6 to 12 percent slopes, severely eroded
Wo	Woodmere silt loam
ZaB2	Zanesville silt loam, 2 to 6 percent slopes, eroded
ZaB3	Zanesville silt loam, 2 to 6 percent slopes, severely eroded
ZaC2	Zanesville silt loam, 6 to 12 percent slopes, eroded
ZaC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded
ZaD	Zanesville silt loam, 12 to 18 percent slopes
ZaD3	Zanesville silt loam, 12 to 18 percent slopes, severely eroded

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry — FY
- Ford — FORD
- Grade
- R. R. over
- R. R. under

Tunnel

Buildings
- School
- Church

Station, forest fire or lookout

Mines and Quarries

Mine dump

Pits, gravel or other

Power line

Pipe line

Cemetery

Dams

Levee

Tanks

Well, oil or gas

BOUNDARIES

- National or state
- County
- Minor civil division
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
- Unclassified

Canals and ditches — CANAL

Lakes and ponds
- Perennial — water, w
- Intermittent

Wells, water — flowing

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions, unclassified — Large, Small

SOIL SURVEY DATA

Soil boundary and symbol — Dx

Gravel

Stony, very stony

Rock outcrops

Chert fragments

Clay spot

Sand spot

Gumbo or scabby spot

Made land

Severely eroded spot

Blowout, wind erosion

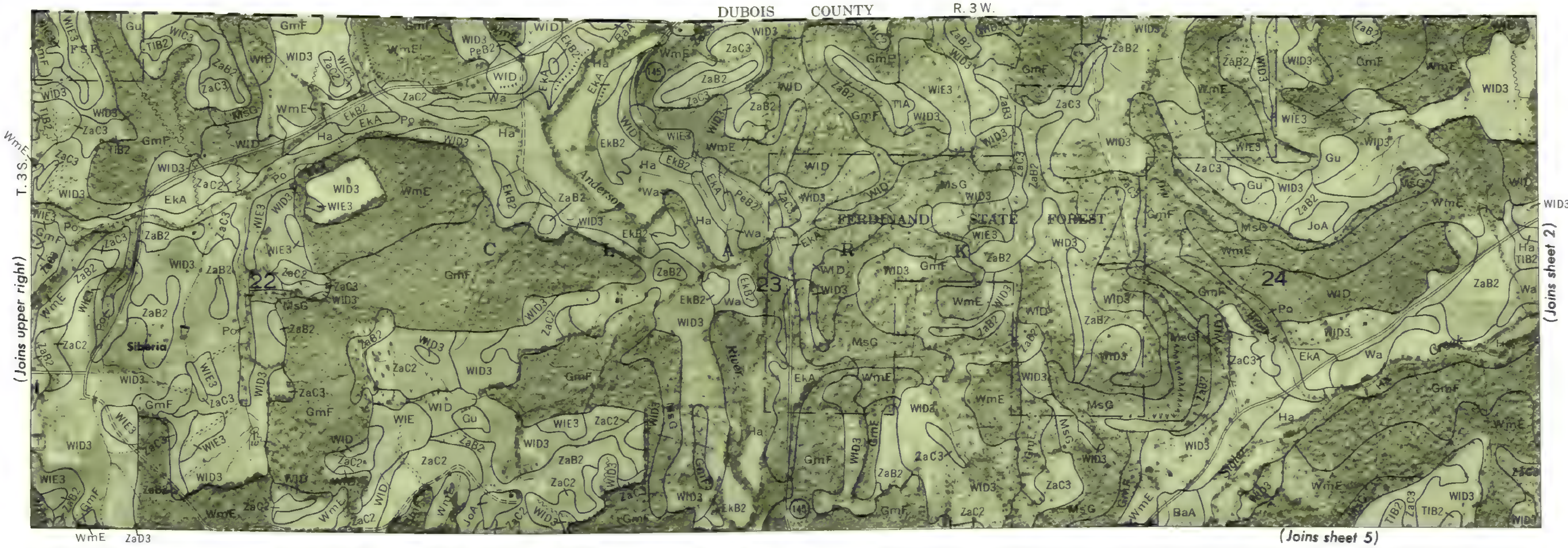
Gullies
- Crossable with tillage implements
- Not crossable with tillage implements

Soil map constructed 1967 by Cartographic Division, Soil Conservation Service, USDA, from 1958 aerial photographs. Controlled mosaic based on Indiana plane coordinate system, west zone, transverse Mercator projection, 1927 North American datum.

Predicted yields, table 2, page 38; page 40; and table 6, page 52.

Map symbol	Mapping unit	Described on page	Capability unit Symbol	Capability unit Page	Woodland group Number	Woodland group Page
AfB2	Alford silt loam, 2 to 6 percent slopes, eroded	6	IIe-3	32	1	40
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded	6	IIIe-3	33	1	40
AfC3	Alford silt loam, 6 to 12 percent slopes, severely eroded	6	IVe-3	35	1	40
AfD	Alford silt loam, 12 to 18 percent slopes	7	IVe-3	35	1	40
AfD3	Alford silt loam, 12 to 18 percent slopes, severely eroded	7	VIe-1	35	1	40
AfE3	Alford silt loam, 18 to 25 percent slopes, severely eroded	7	VIe-1	35	2	40
BaA	Bartle silt loam, 0 to 3 percent slopes	7	IIw-2	33	5	40
Br	Bruno fine sandy loam	8	IIs-8	33	8-A	40
CoE	Corydon stony silt loam, 18 to 25 percent slopes	9	VIIe-2	35	7	40
CoG	Corydon stony silt loam, 25 to 70 percent slopes	9	VIIe-2	35	7	40
CrB2	Crider silt loam, 2 to 6 percent slopes, eroded	9	IIe-3	32	1	40
CrD2	Crider silt loam, 12 to 18 percent slopes, eroded	9	IVe-3	35	1	40
CsC3	Crider silty clay loam, 6 to 12 percent slopes, severely eroded	9	IVe-3	35	1	40
CsD3	Crider silty clay loam, 12 to 18 percent slopes, severely eroded	9	VIe-1	35	1	40
Cu	Cuba silt loam	10	I-2	32	8-A	40
EkA	Elkinsville silt loam, 0 to 2 percent slopes	11	I-1	31	1	40
EkB2	Elkinsville silt loam, 2 to 6 percent slopes, eroded	11	IIe-3	32	1	40
EkC3	Elkinsville silt loam, 6 to 12 percent slopes, severely eroded	11	IVe-3	35	1	40
GmF	Gilpin-Wellston-Muskingum association, 25 to 35 percent slopes	11	VIe-1	35	12	40
Gn	Ginat silt loam	12	IIIw-3	34	11	40
Gu	Gullied land	12	VIIe-4	36	14	40
Ha	Haymond silt loam	13	I-2	32	8-A	40
HeA	Henshaw silt loam, 0 to 2 percent slopes	13	IIw-2	33	5	40
HeB2	Henshaw silt loam, 2 to 6 percent slopes, eroded	14	IIw-2	33	5	40
Hu	Huntington silt loam	14	I-2	32	8-A	40
JoA	Johnsburg silt loam, 0 to 2 percent slopes	15	IIIw-3	34	5	40
JoB2	Johnsburg silt loam, 2 to 6 percent slopes, eroded	15	IIIw-3	34	5	40
Ln	Lindside silt loam	15	I-2	32	2	40
MaD2	Markland silt loam, 12 to 18 percent slopes, eroded	16	VIe-1	35	18	40
MaE2	Markland silt loam, 18 to 25 percent slopes, eroded	16	VIe-1	35	18	40
MkC3	Markland silty clay loam, 6 to 12 percent slopes, severely eroded	16	VIe-1	35	18	40
MkD3	Markland silty clay loam, 12 to 18 percent slopes, severely eroded	16	VIe-1	35	18	40
MkE3	Markland silty clay loam, 18 to 25 percent slopes, severely eroded	16	VIe-1	35	18	40
MkF3	Markland silty clay loam, 25 to 35 percent slopes, severely eroded	16	VIIe-1	35	18	40
Mr	McGary silt loam	17	IIIw-3	34	5	40
MsG	Muskingum-Gilpin association, 35 to 70 percent slopes	18	VIIe-1	35	12	40
Ne	Newark silt loam	18	IIw-7	33	13	40
Pa	Patton silty clay loam	19	IIw-1	32	11	40

Map symbol	Mapping unit	Described on page	Capability unit Symbol	Capability unit Page	Woodland group Number	Woodland group Page
PeA	Pekin silt loam, 0 to 2 percent slopes	20	I-1	31	1	40
PeB2	Pekin silt loam, 2 to 6 percent slopes, eroded	20	IIe-7	32	1	40
Ph	Philo silt loam	20	I-2	32	8-A	40
Po	Pope loam, channery subsoil variant	21	IIIw-11	34	8-B	40
PrB2	Princeton fine sandy loam, 2 to 6 percent slopes, eroded	21	IIe-3	32	2	40
PsE3	Princeton loam, 12 to 25 percent slopes, severely eroded	21	VIe-1	35	2	40
Ra	Rahm silt loam	22	IIw-7	33	8-A	40
ScA	Sciotoville silt loam, 0 to 2 percent slopes	23	IIw-5	33	9	40
ScB2	Sciotoville silt loam, 2 to 6 percent slopes, eroded	23	IIe-7	32	9	40
Sd	Stendall silt loam	23	IIw-7	33	13	40
St	Strip mines	23	VIIe-3	36	16	40
Te	Terrace escarpments	23	VIIe-1	35	2	40
TlA	Tilsit silt loam, 0 to 2 percent slopes	24	IIw-5	33	9	40
TlB2	Tilsit silt loam, 2 to 6 percent slopes, eroded	24	IIe-7	32	9	40
UnB2	Uniontown silt loam, 2 to 6 percent slopes, eroded	25	IIe-3	32	1	40
UnC3	Uniontown silt loam, 6 to 12 percent slopes, severely eroded	25	IVe-3	35	1	40
Wa	Wakeland silt loam	25	IIw-7	33	13	40
WeA	Weinbach silt loam, 0 to 2 percent slopes	26	IIw-2	33	5	40
WeB2	Weinbach silt loam, 2 to 4 percent slopes, eroded	26	IIw-2	33	5	40
WlB2	Wellston silt loam, 2 to 6 percent slopes, eroded	27	IIe-3	32	10	40
WlB3	Wellston silt loam, 2 to 6 percent slopes, severely eroded	27	IIIe-3	33	10	40
WlC2	Wellston silt loam, 6 to 12 percent slopes, eroded	27	IIIe-3	33	10	40
WlC3	Wellston silt loam, 6 to 12 percent slopes, severely eroded	27	IVe-3	35	10	40
WlD	Wellston silt loam, 12 to 18 percent slopes	27	IVe-3	35	10	40
WlD3	Wellston silt loam, 12 to 18 percent slopes, severely eroded	27	VIe-1	35	10	40
WlE	Wellston silt loam, 18 to 25 percent slopes	27	VIe-1	35	10	40
WlE3	Wellston silt loam, 18 to 25 percent slopes, severely eroded	27	VIe-1	35	10	40
WmE	Wellston-Gilpin-Muskingum association, 18 to 25 percent slopes	27	VIe-1	35	12	40
WnA	Wheeling silt loam, 0 to 2 percent slopes	28	I-1	31	1	40
WnB2	Wheeling silt loam, 2 to 6 percent slopes, eroded	28	IIe-3	32	1	40
WnC2	Wheeling silt loam, 6 to 12 percent slopes, eroded	28	IIIe-3	33	1	40
WnC3	Wheeling silt loam, 6 to 12 percent slopes, severely eroded	28	IVe-3	35	1	40
Wo	Woodmere silt loam	29	I-2	32	8-A	40
ZaB2	Zanesville silt loam, 2 to 6 percent slopes, eroded	30	IIe-7	32	9	40
ZaB3	Zanesville silt loam, 2 to 6 percent slopes, severely eroded	30	IIIe-7	34	9	40
ZaC2	Zanesville silt loam, 6 to 12 percent slopes, eroded	30	IIIe-7	34	9	40
ZaC3	Zanesville silt loam, 6 to 12 percent slopes, severely eroded	30	IVe-7	35	9	40
ZaD	Zanesville silt loam, 12 to 18 percent slopes	30	IVe-7	35	9	40
ZaD3	Zanesville silt loam, 12 to 18 percent slopes, severely eroded	30	VIe-1	35	9	40



0 ½ Mile
Scale 1:15 840
0 3 000 Feet

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 1

PERRY COUNTY, INDIANA — SHEET NUMBER 2

(2)

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 2

Land division corners are approximately positioned on this map.

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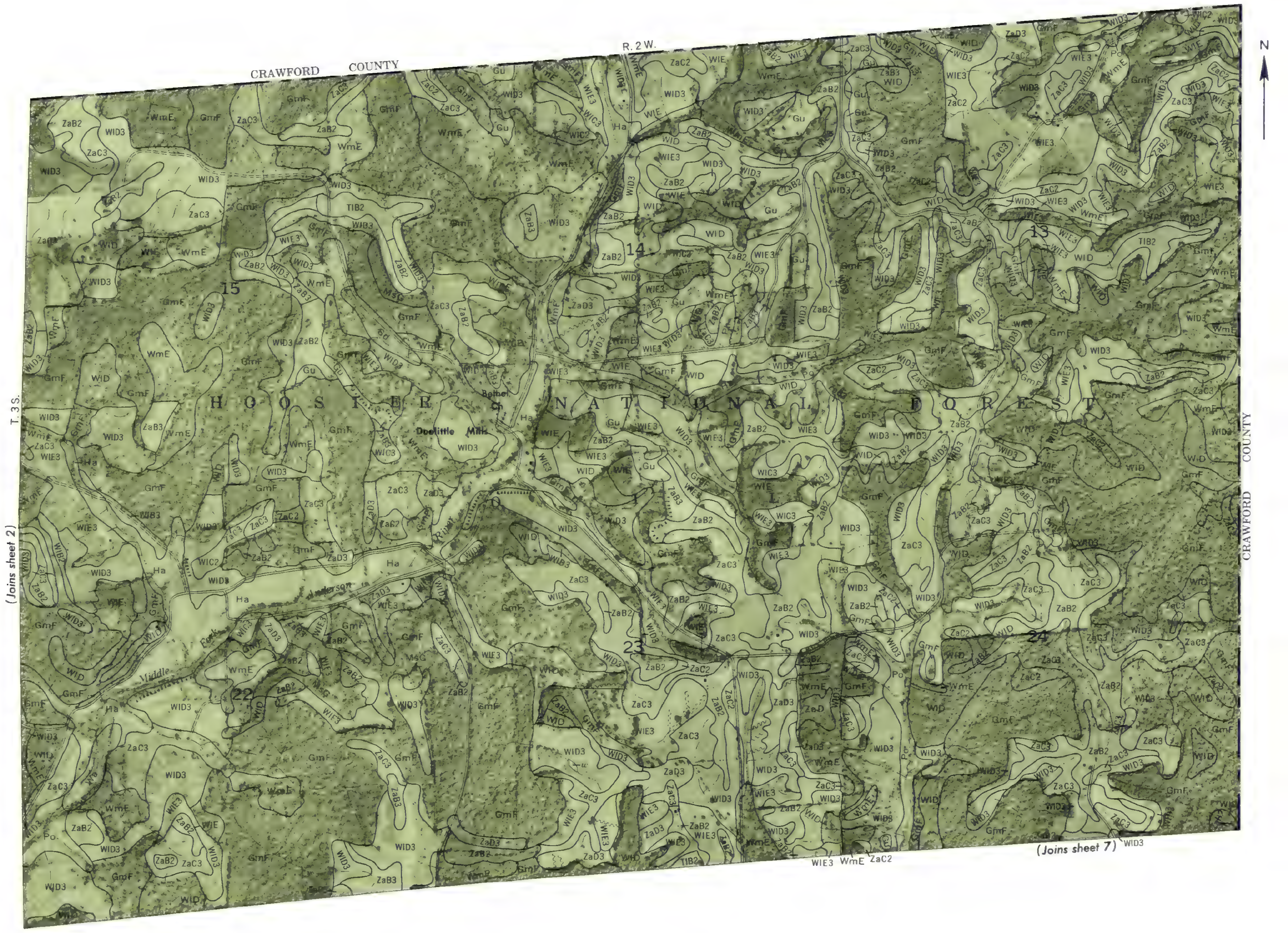
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 3



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 4

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 4

Land division corners are approximately positioned on this map.

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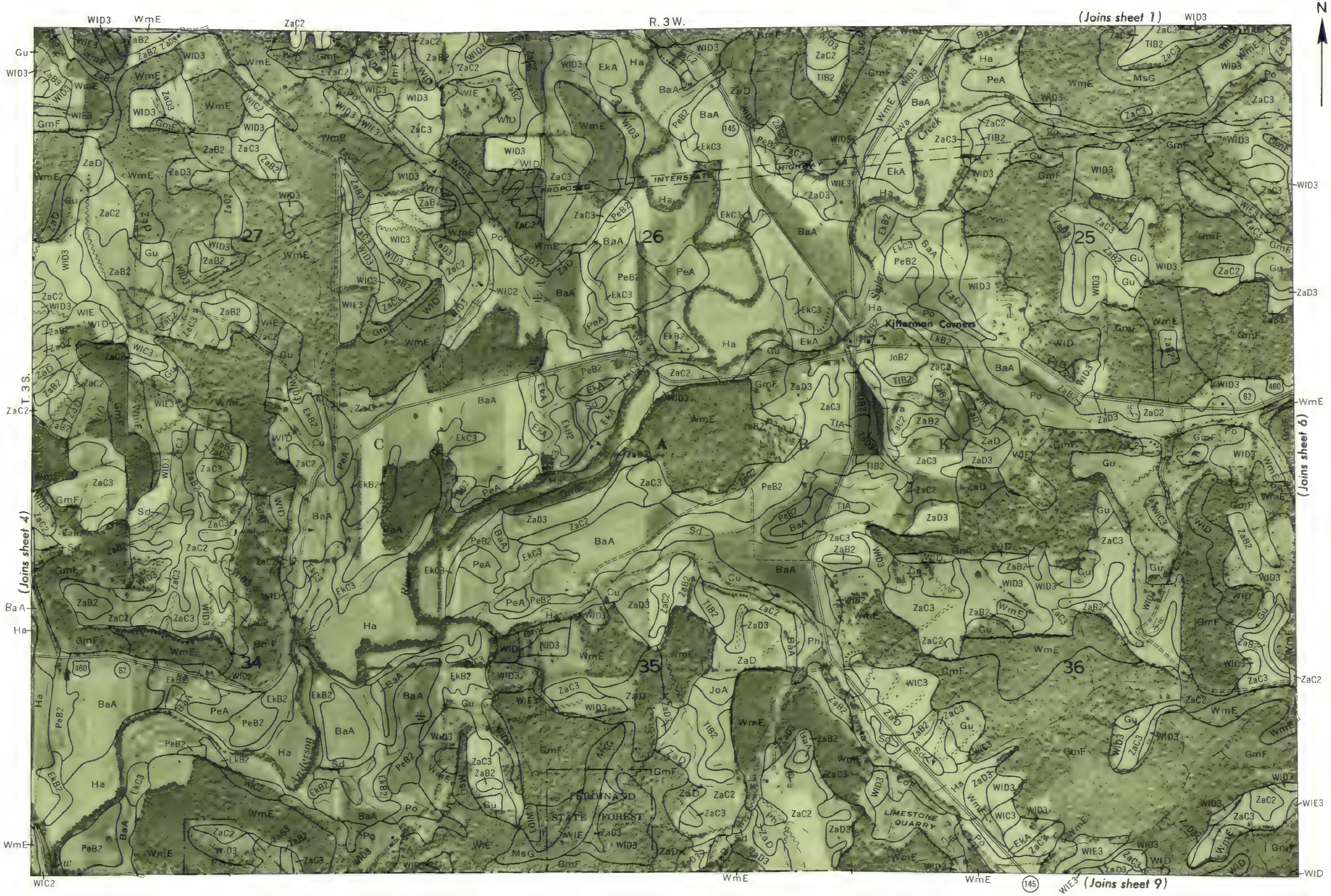

0 ½ Mile Scale 1:15 840 0 3 000 Feet

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Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 5

6

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 6

Land division corners are approximately positioned on this map.

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0 ½ Mile Scale 1:15 840 0 3 000 Feet

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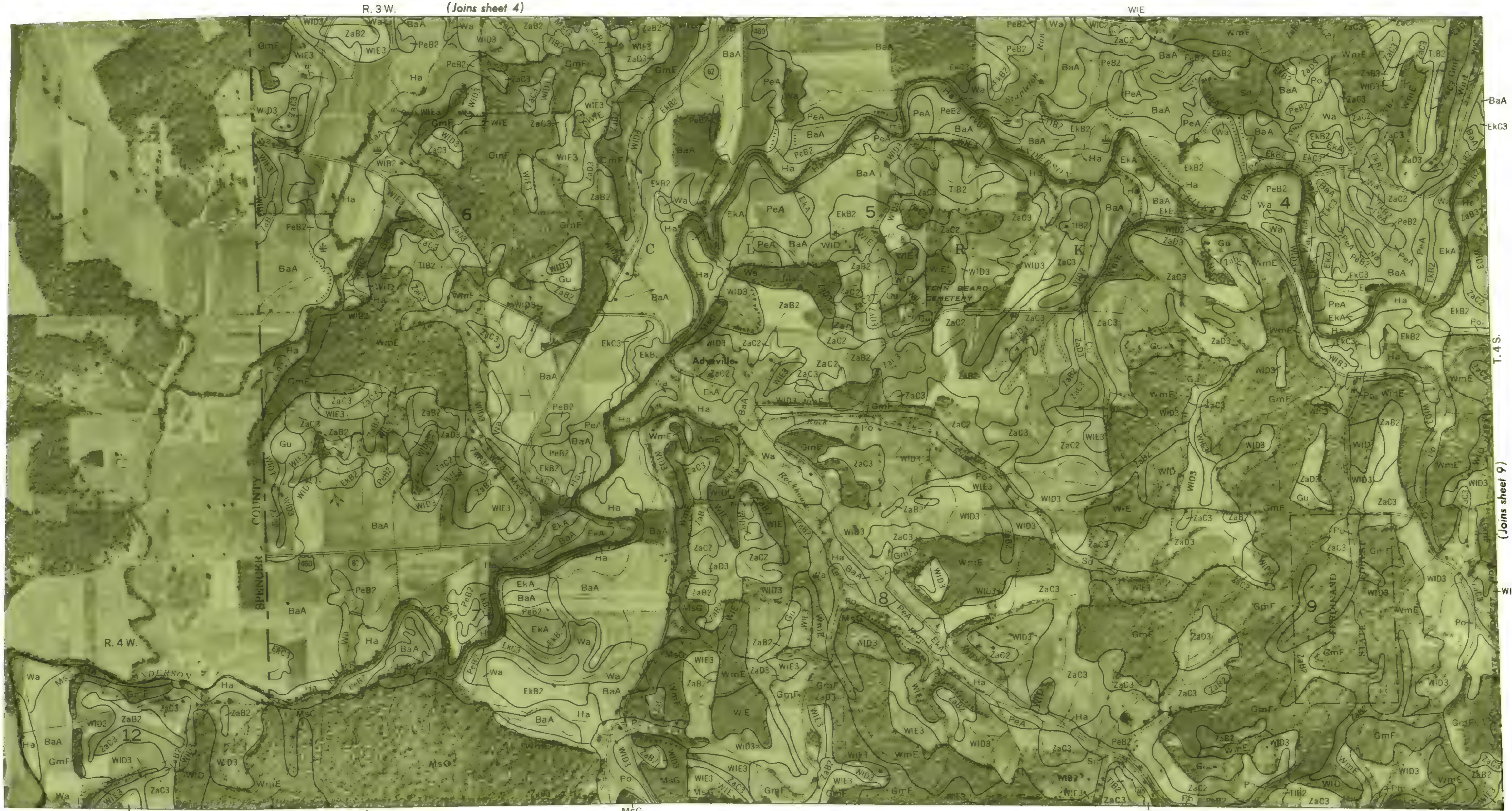
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 7

PERRY COUNTY, INDIANA — SHEET NUMBER 8

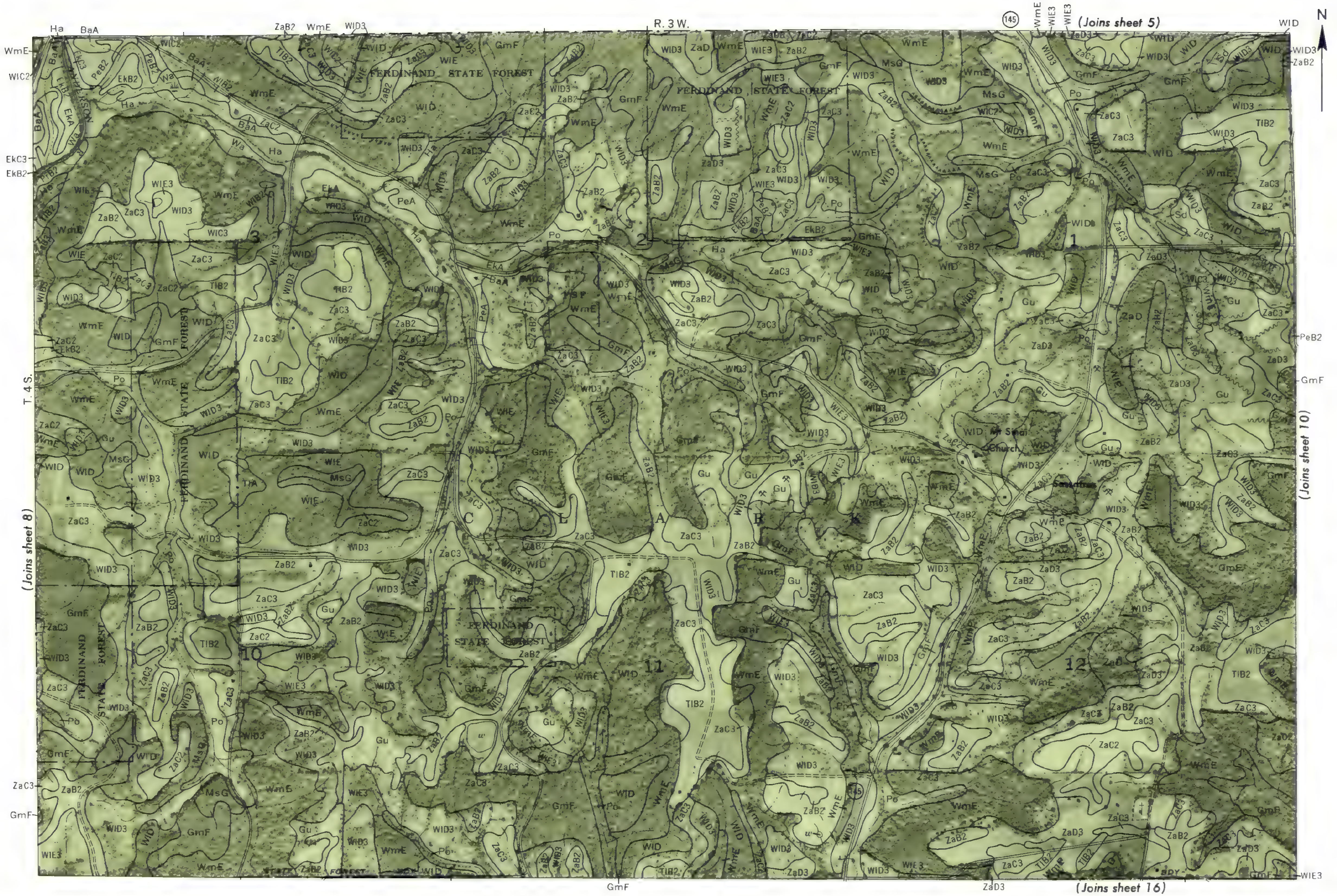


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 8

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station

Land division corners are approximately positioned on this map.

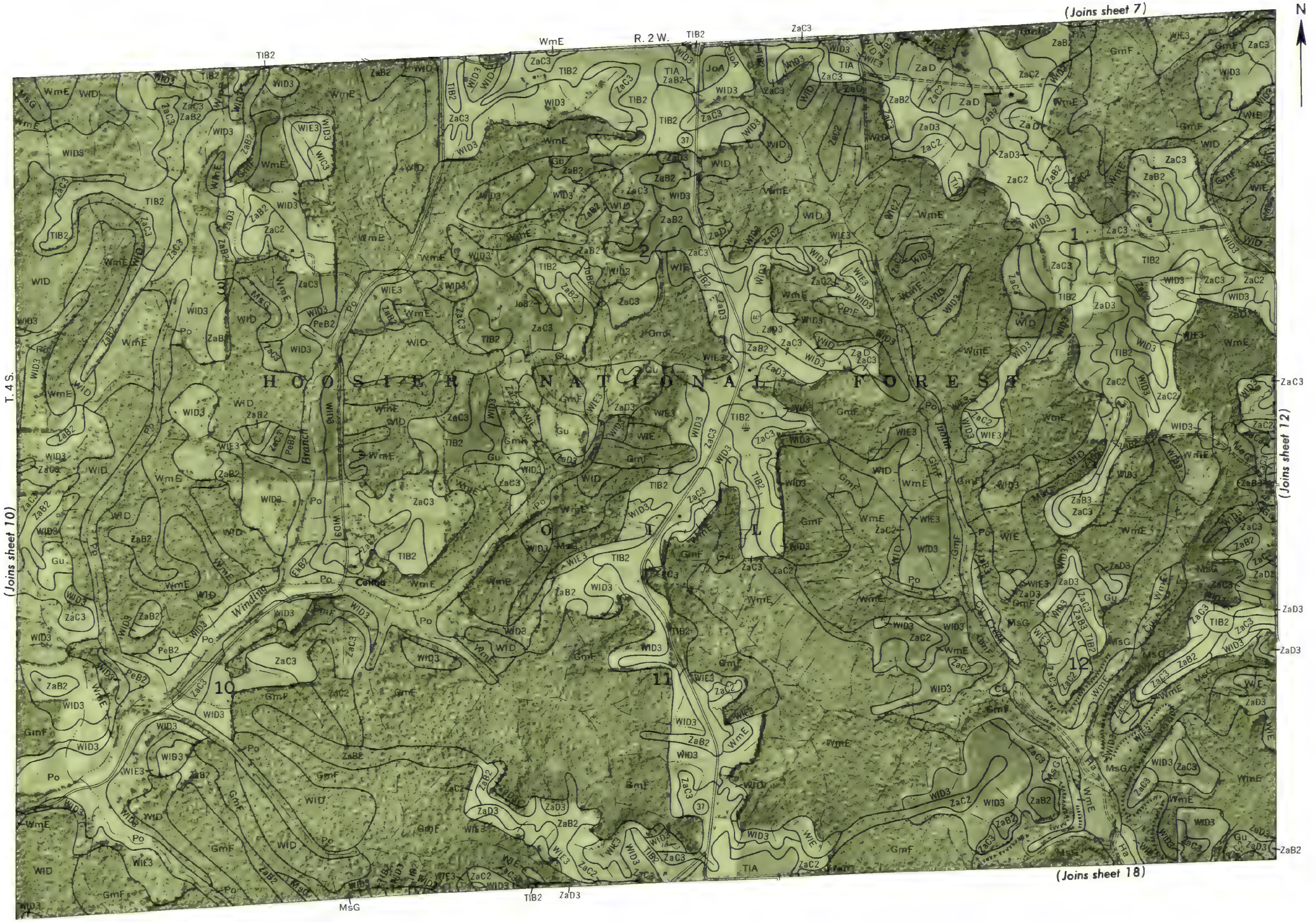
PERRY COUNTY, INDIANA — SHEET NUMBER 10

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 10

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

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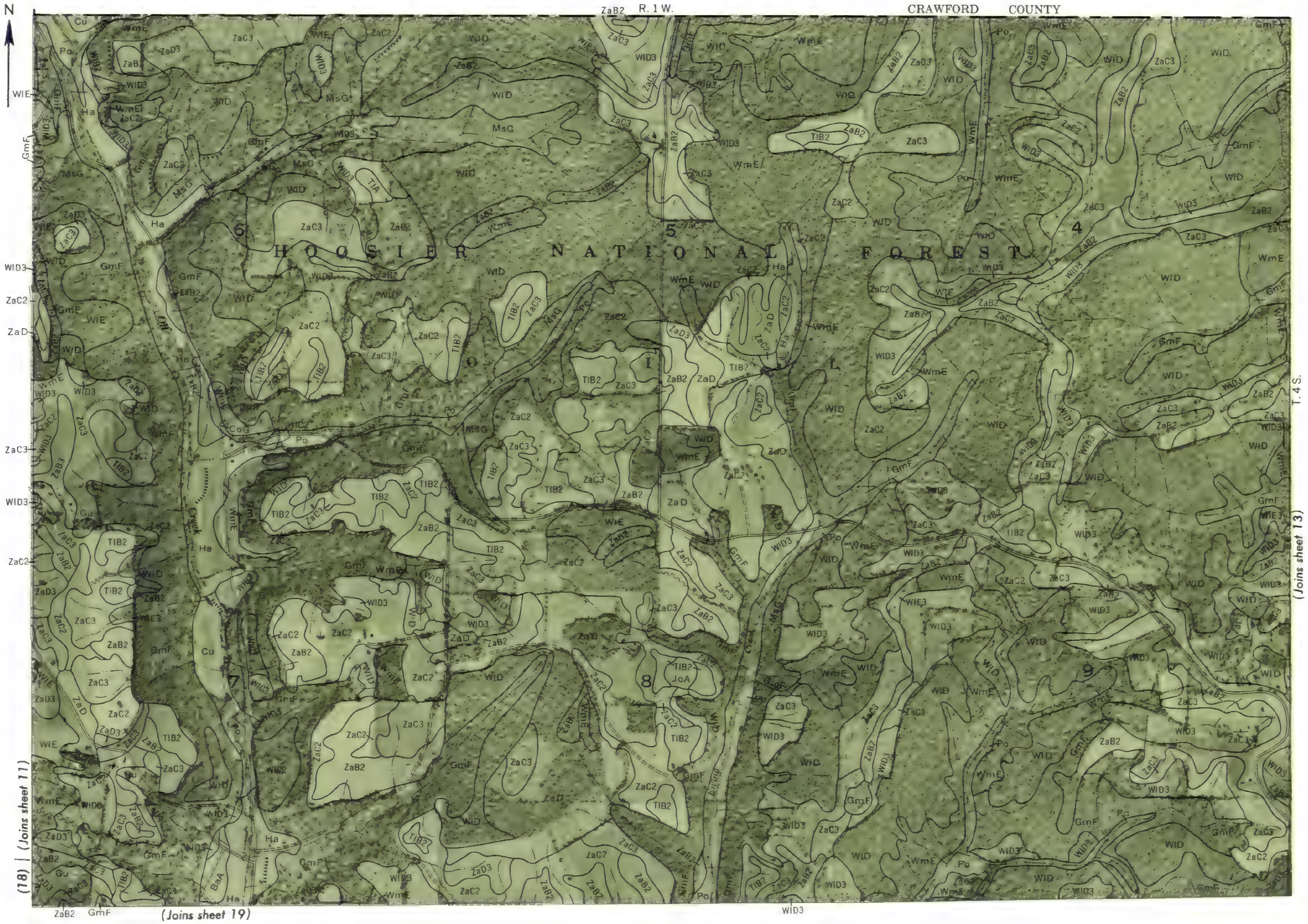
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 11

PERRY COUNTY, INDIANA — SHEET NUMBER 12



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 12

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.

0 ½ Mile Scale 1:15 840 0 3 000 Feet

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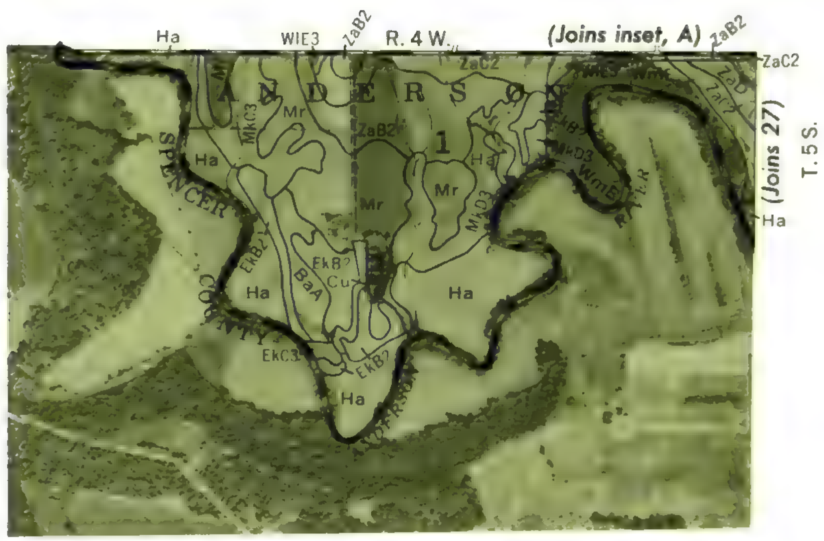
Land division corners are approximately positioned on this map.

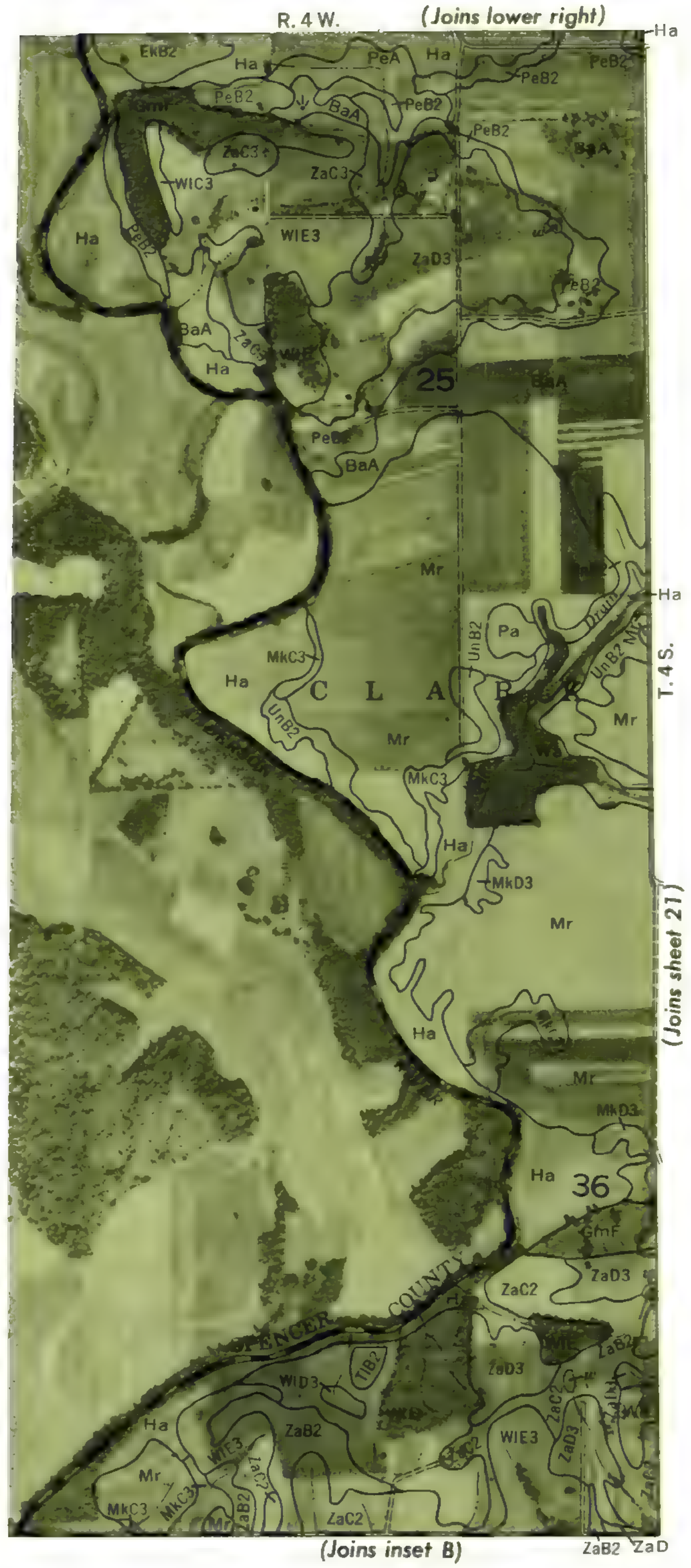
PERRY COUNTY, INDIANA NO. 13

N

INSET B



INSET A

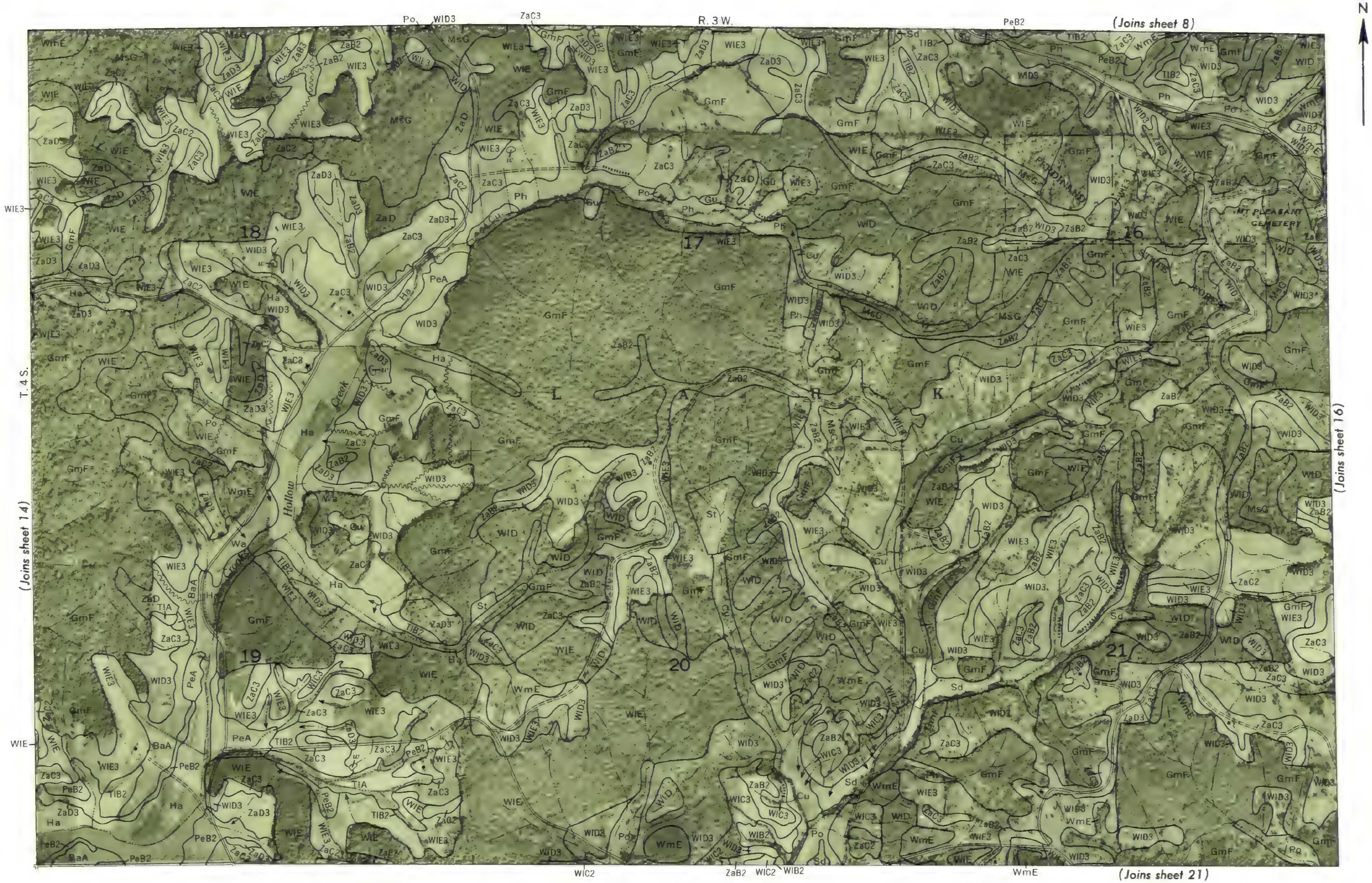


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 14

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.

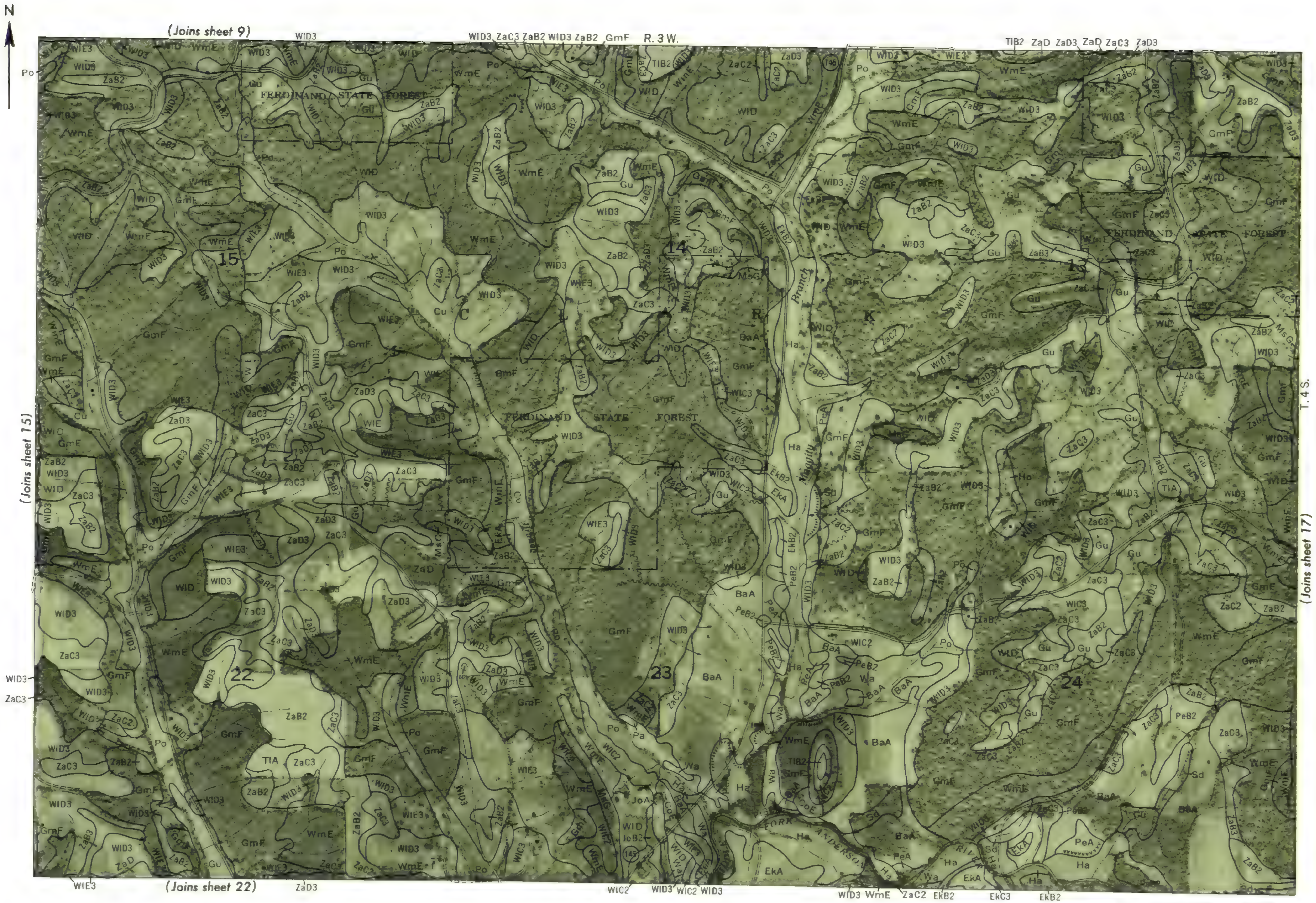


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 15

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.

Land division corners are approximately positioned on this map.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 16

Land division corners are approximately positioned on this map.

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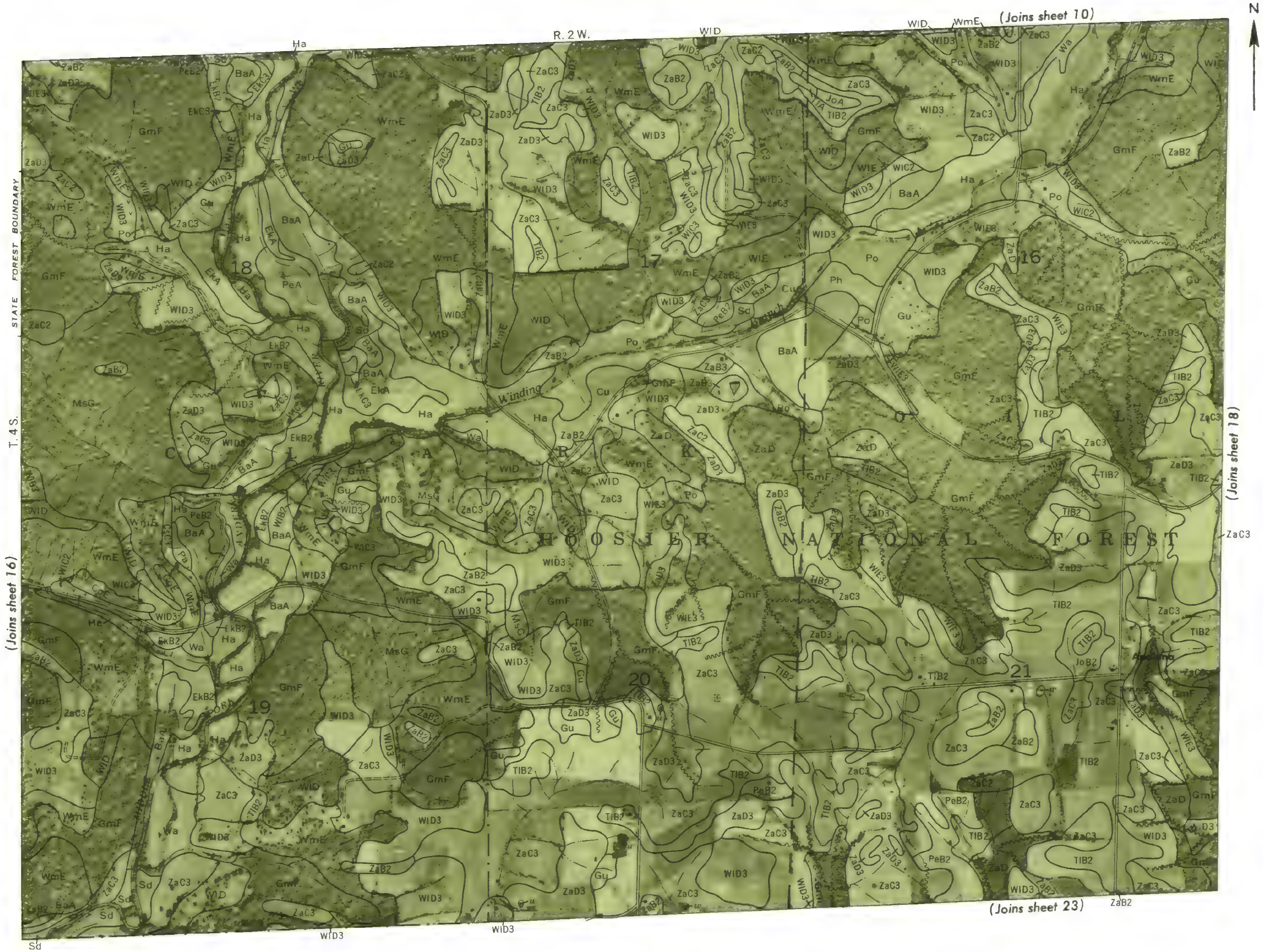
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 17



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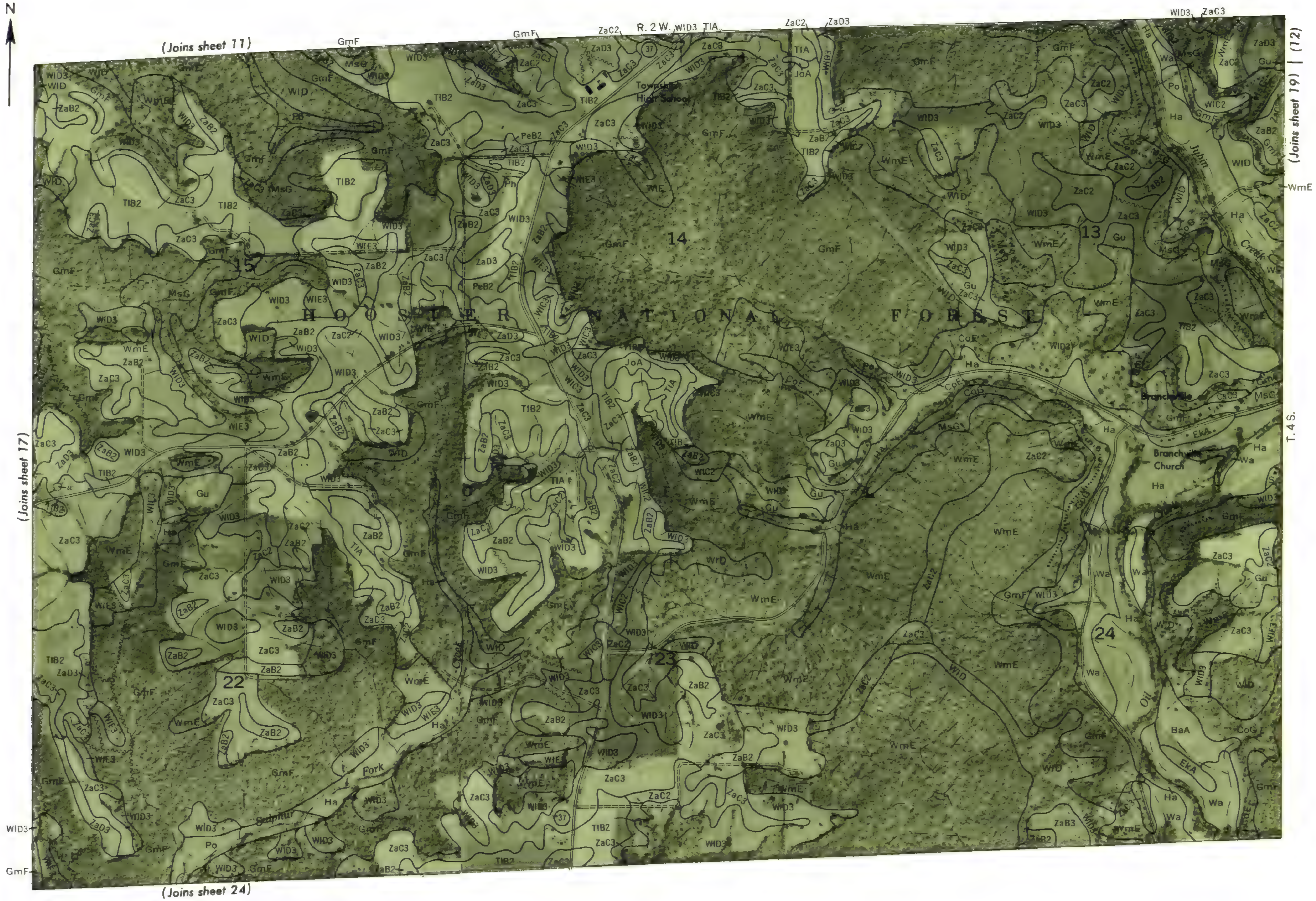
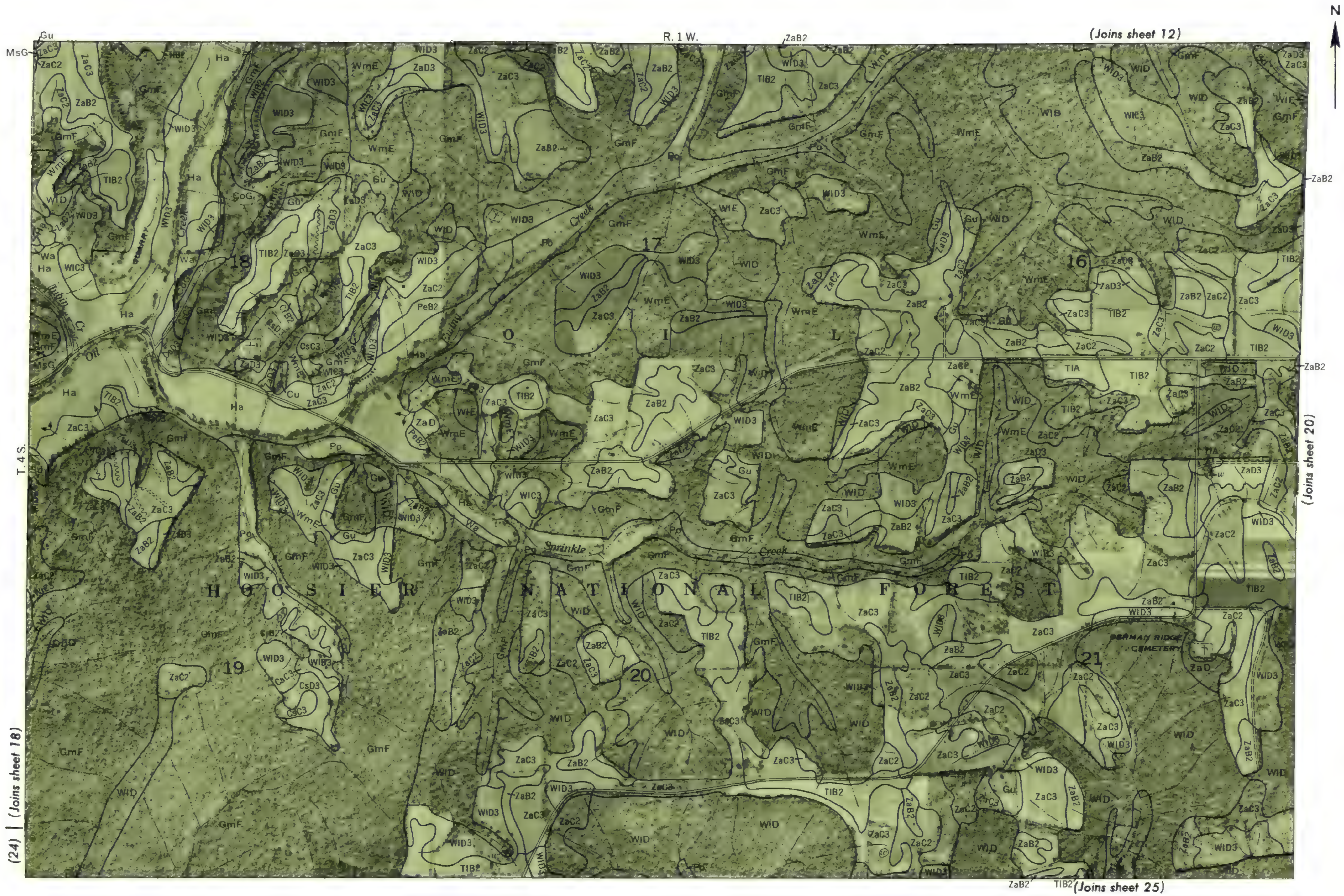


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 18

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.
Land division corners are approximately positioned on this map.
PERRY COUNTY, INDIANA NO. 19

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 20

Land division corners are approximately positioned on this map.

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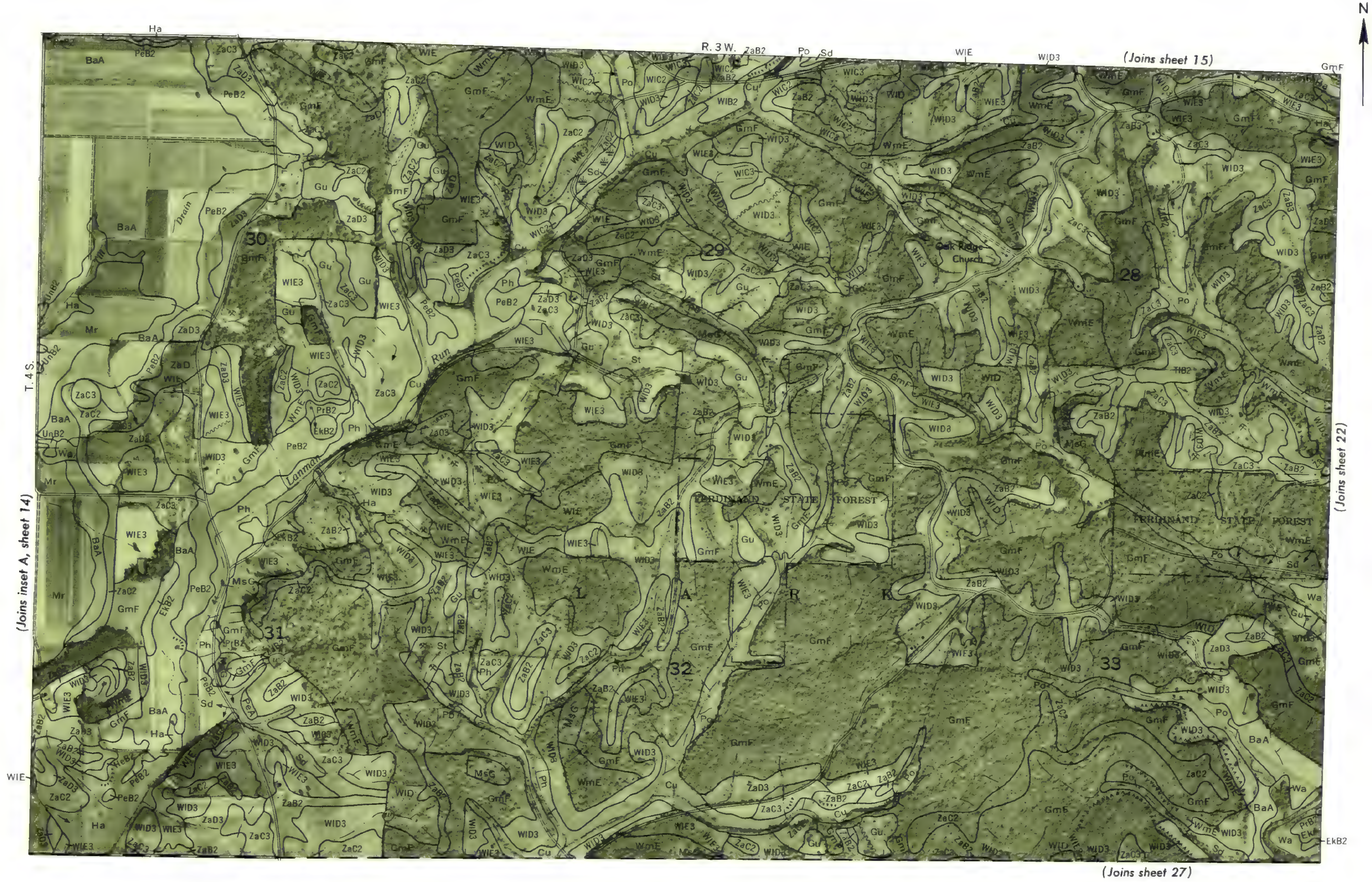
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 21



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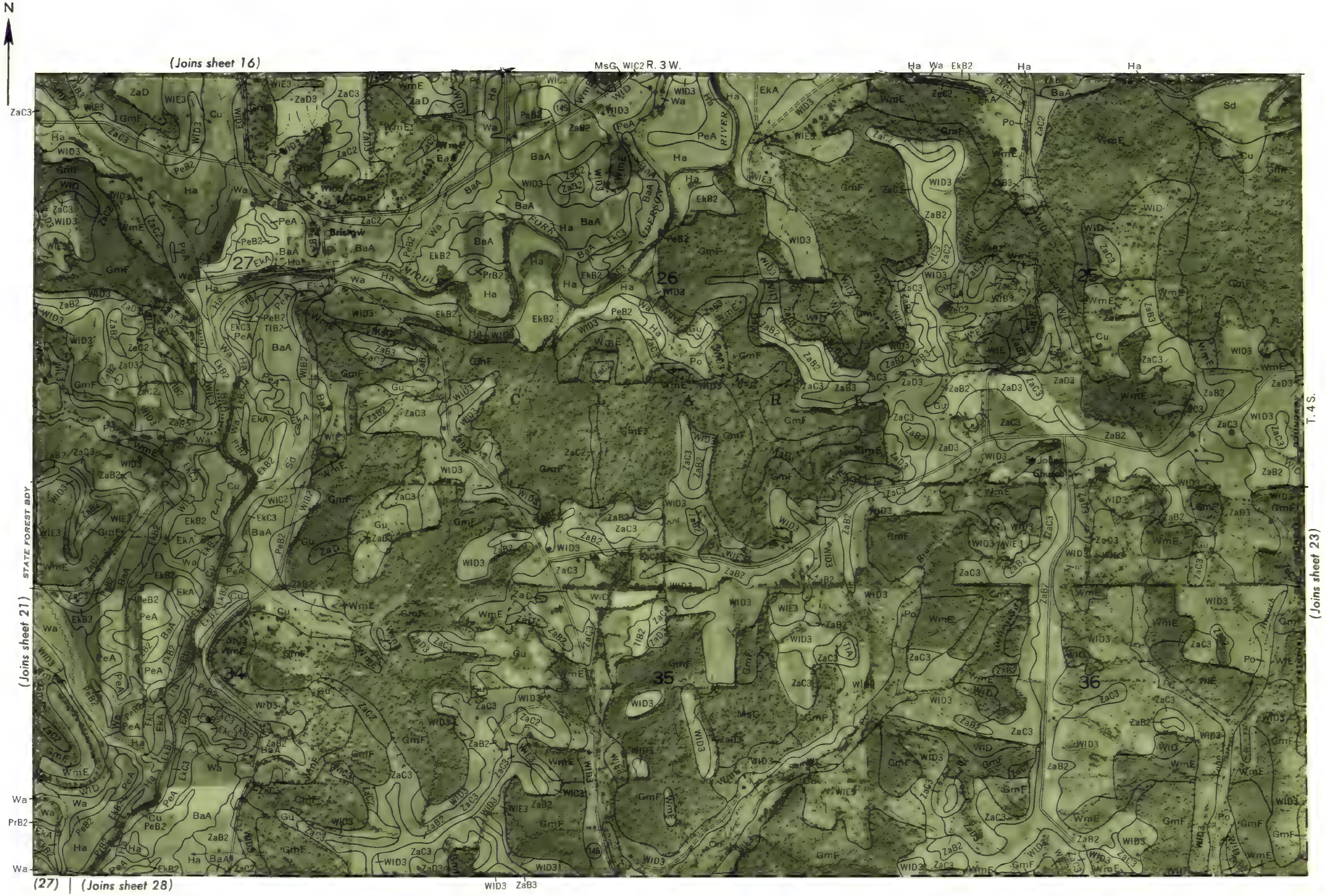

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 22

Land division corners are approximately positioned on this map.

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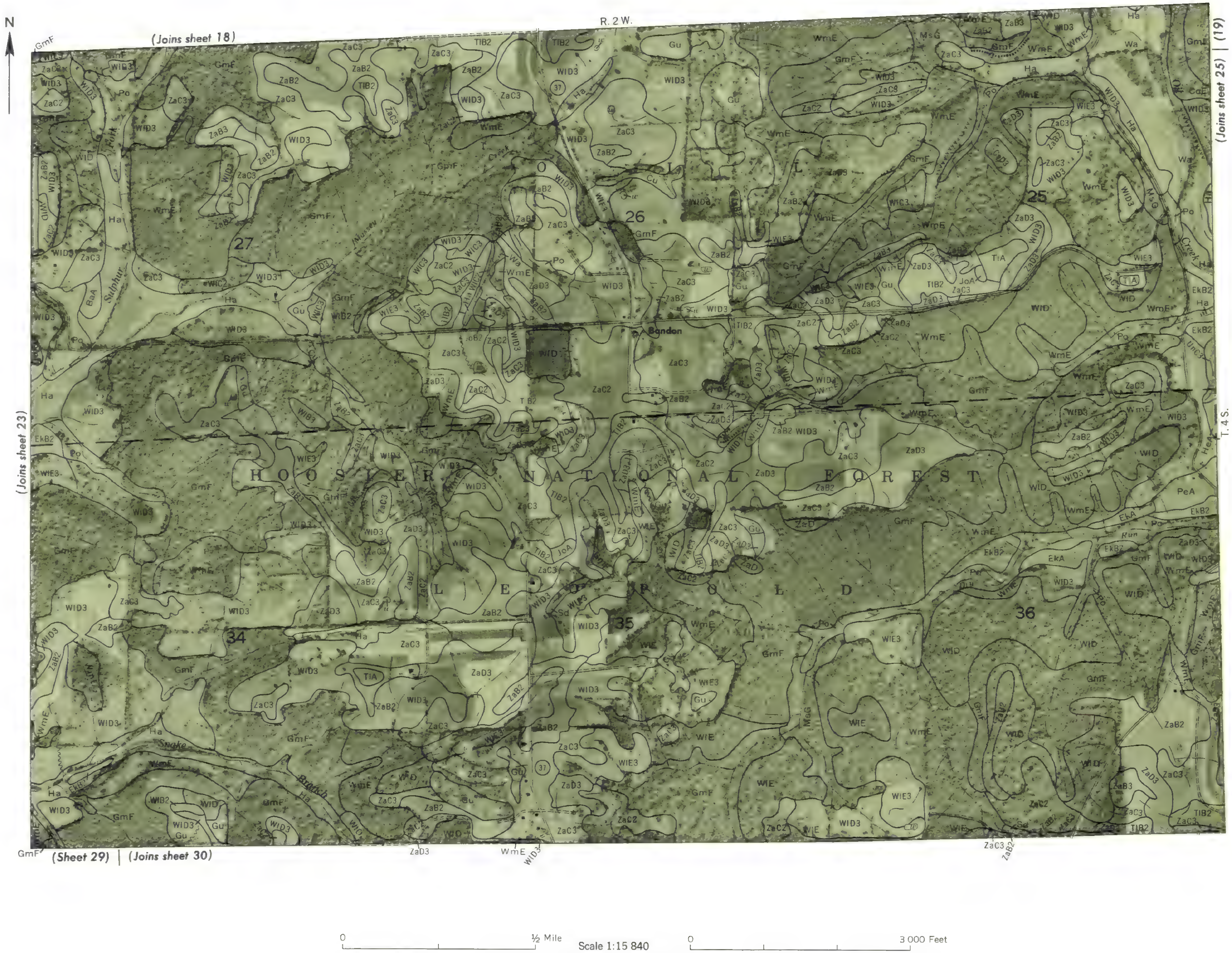
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 23

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 24



PERRY COUNTY, INDIANA NO. 24

Land division corners are approximately positioned on this map.

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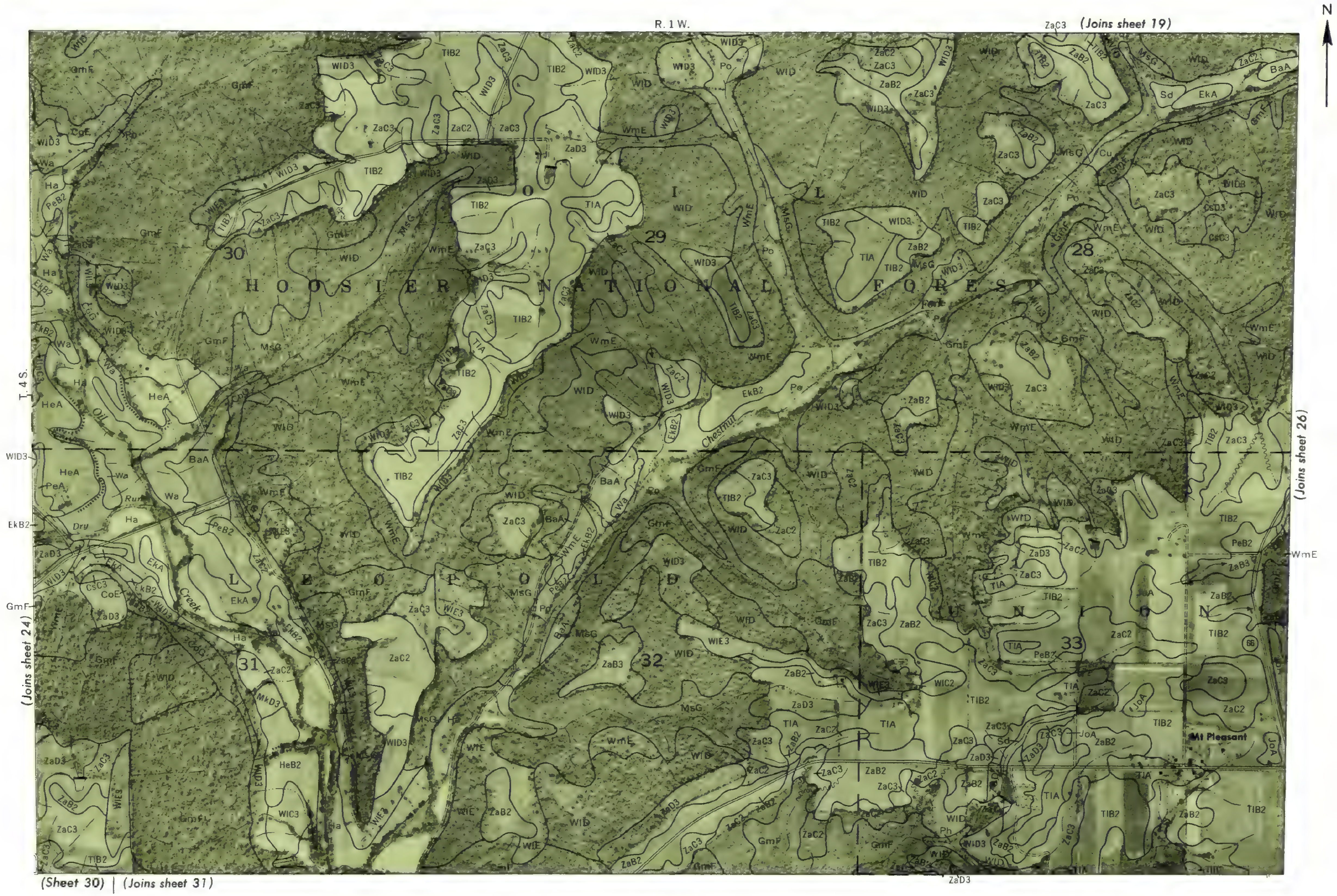
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 25



0 ½ Mile Scale 1:15840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 26

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 26

Land division corners are approximately positioned on this map.

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Land division corners are approximately positioned on this map

PERRY COUNTY, INDIANA NO. 27

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 28

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 28

Land division corners are approximately positioned on this map.

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0 ½ Mile Scale 1:15 840 0 3 000 Feet

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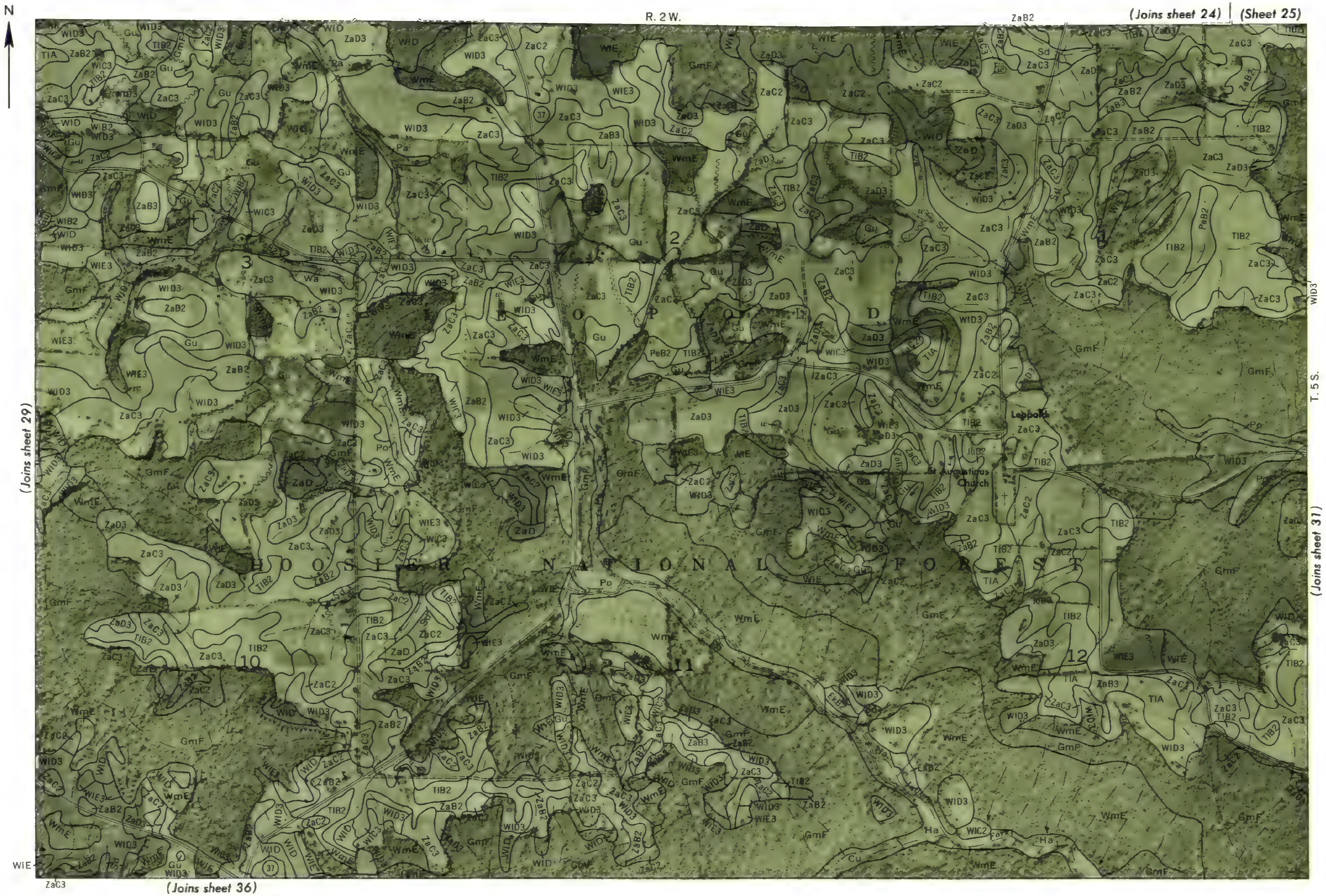
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 29



0 ½ Mile Scale 1:15840 0 3000 Feet

PERRY COUNTY, INDIANA NO. 30

Land division corners are approximately positioned on this map.

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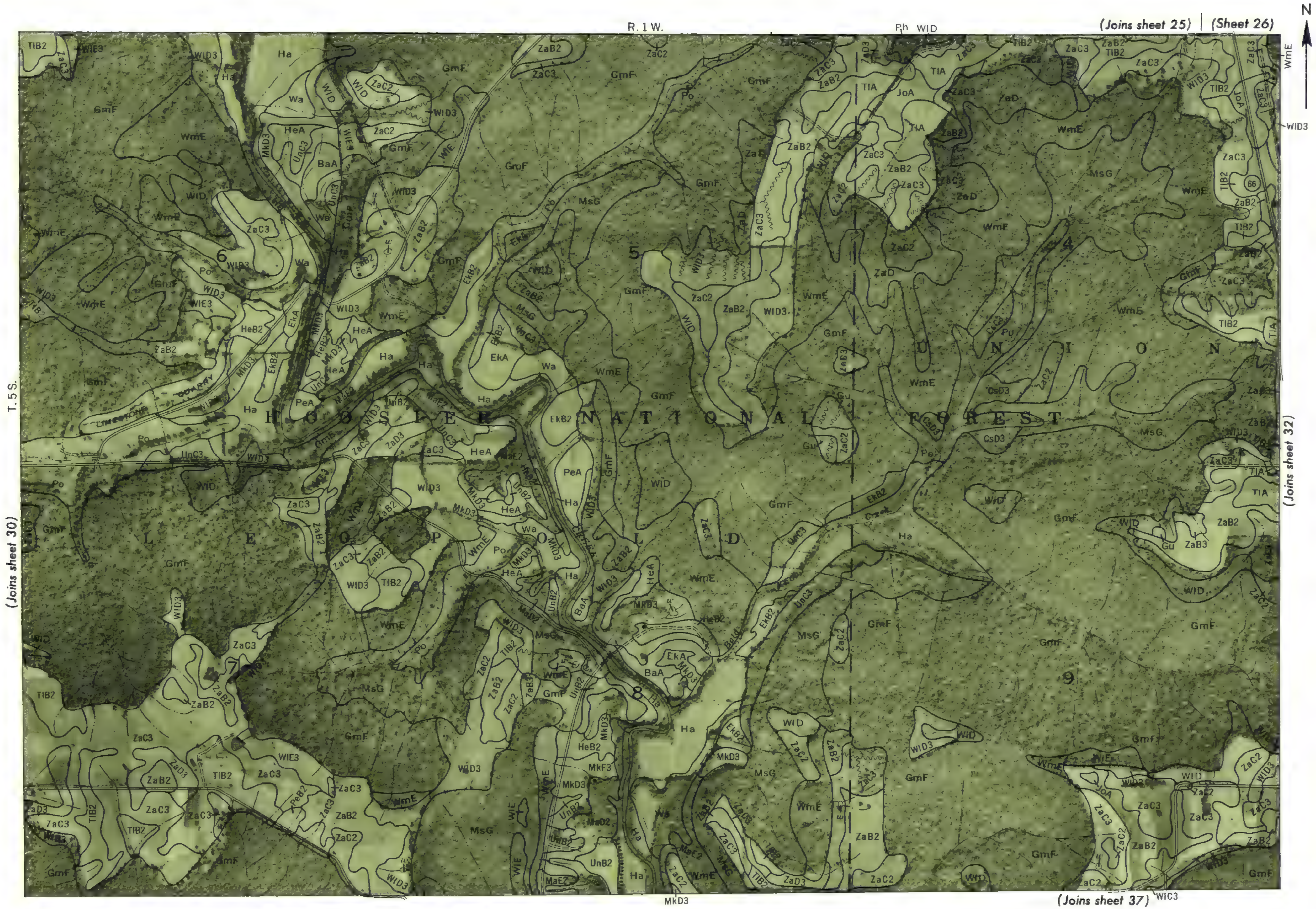
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 31



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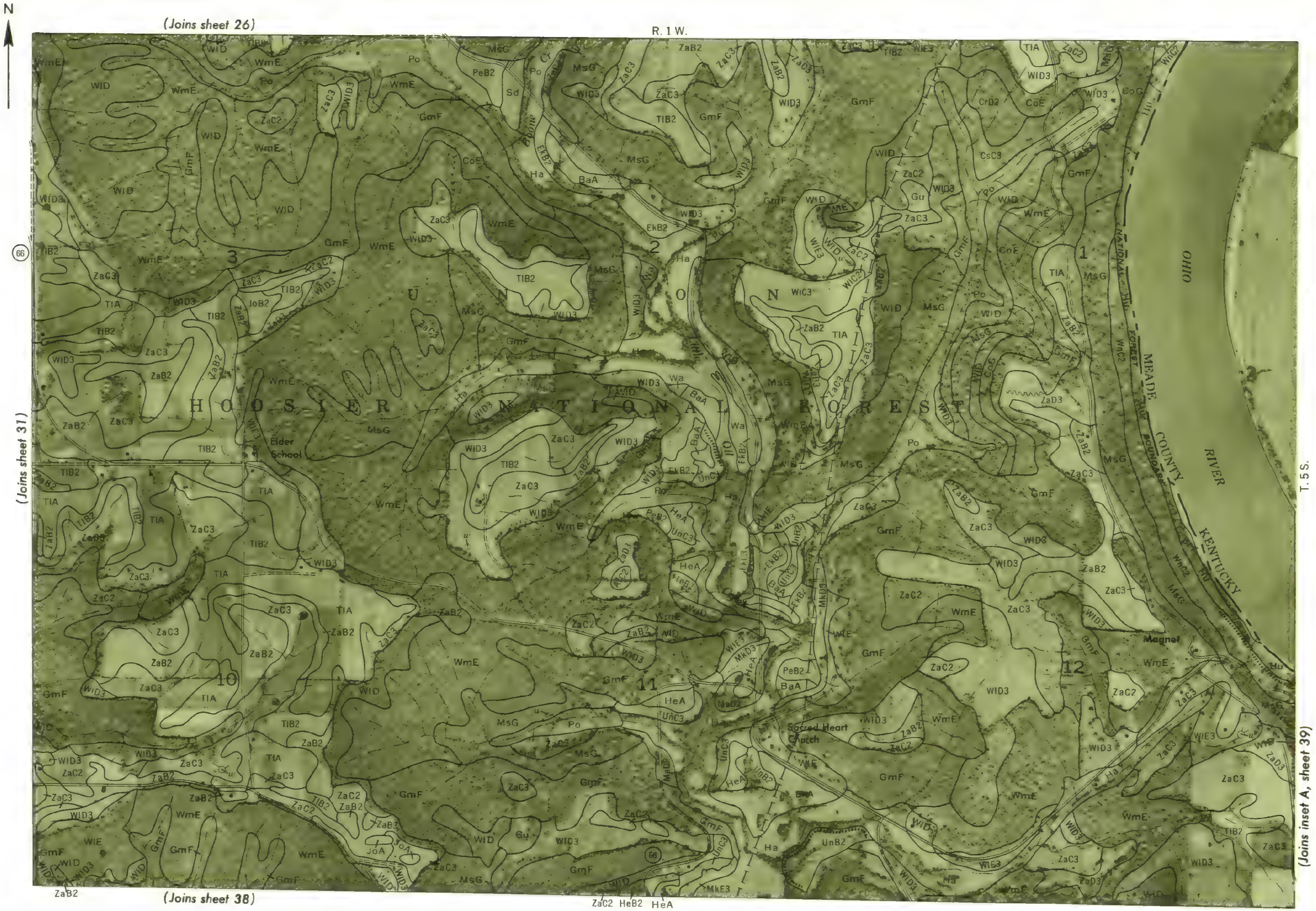
PERRY COUNTY, INDIANA — SHEET NUMBER 32



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 32

Land division corners are approximately positioned on this map.

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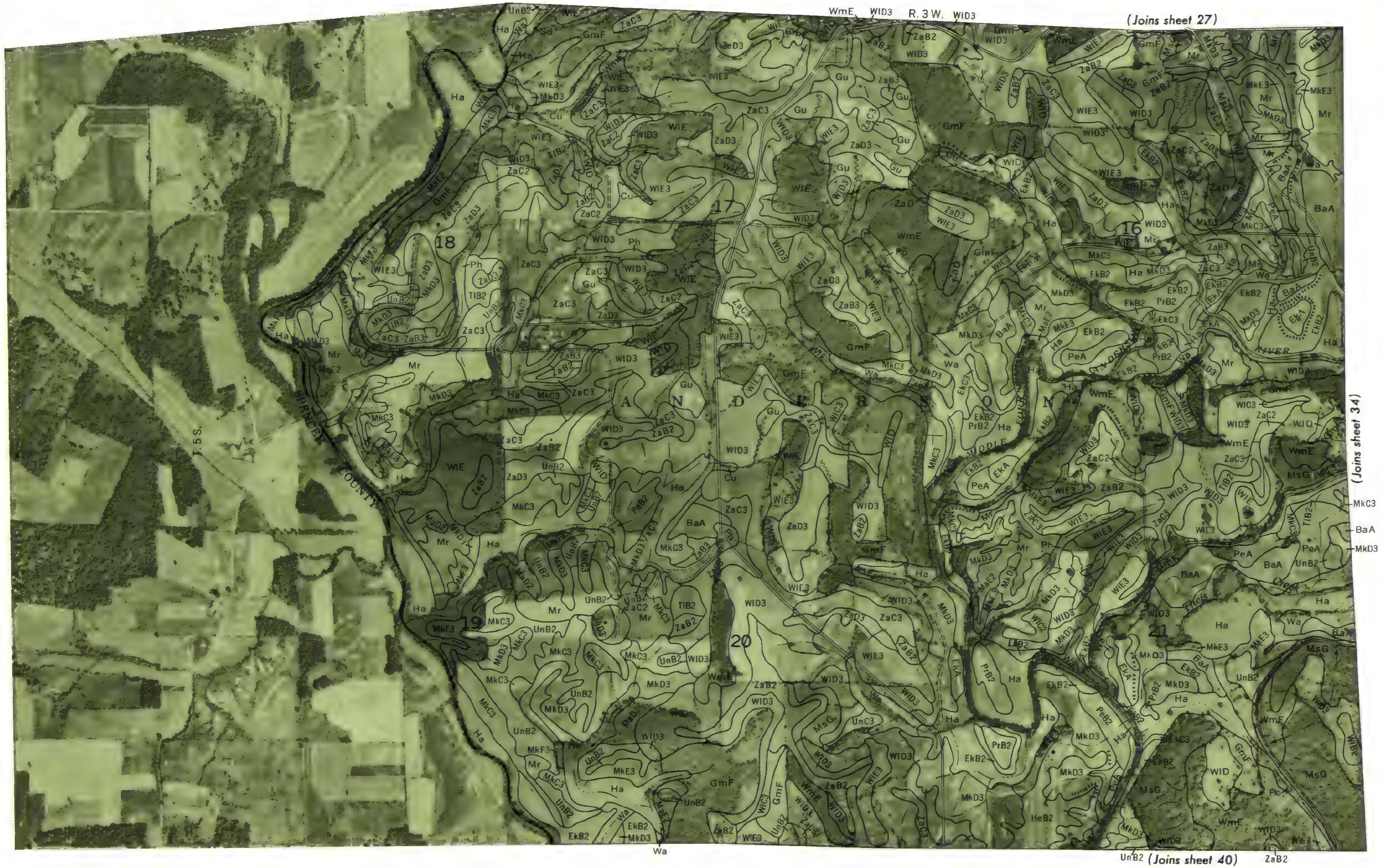
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 33

N



0 ½ Mile Scale 1:15 840 0 3 000 Feet

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 34

Land division corners are approximately positioned on this map.

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0 ½ Mile Scale 1:15 840 0 3 000 Feet

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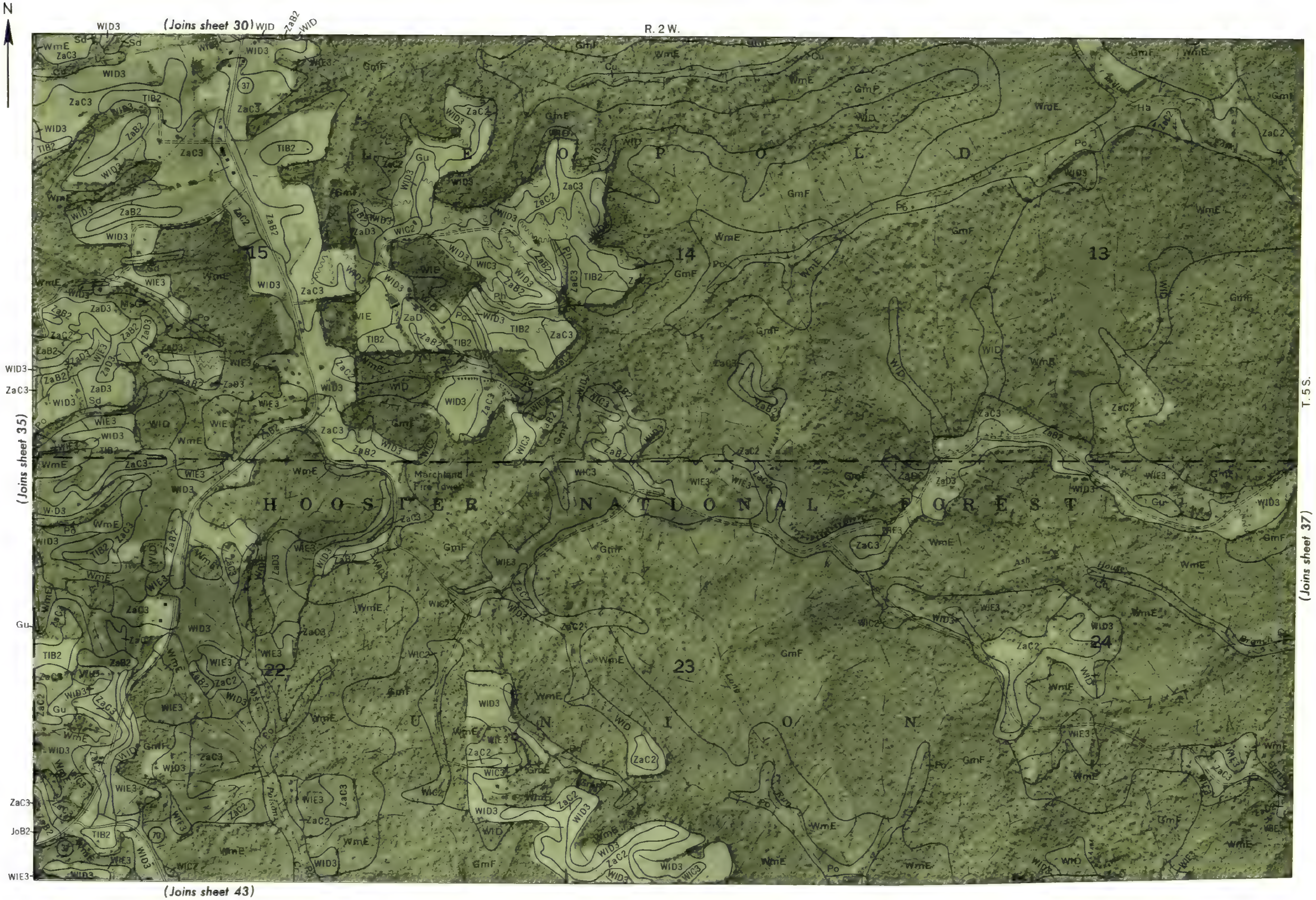
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 35

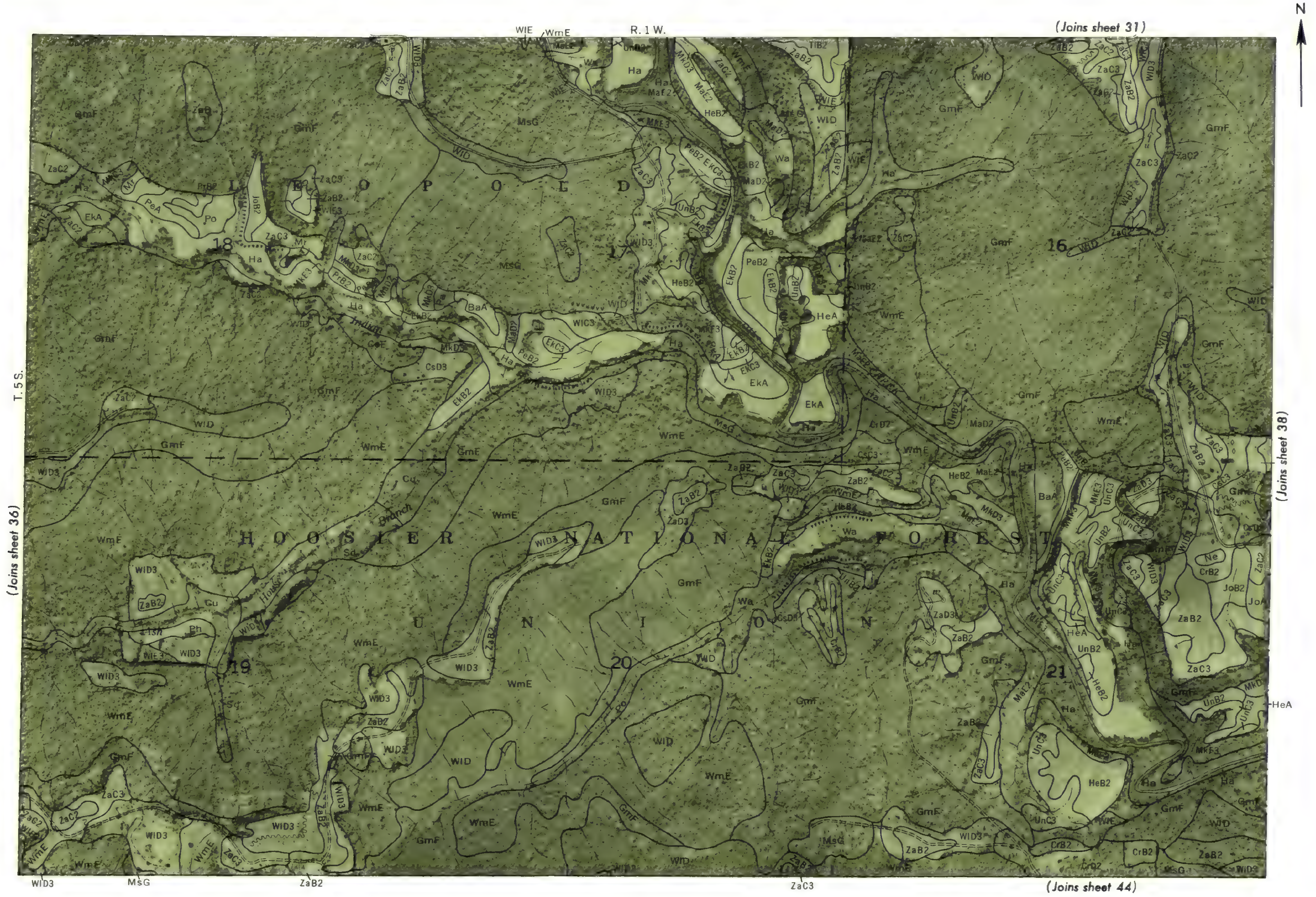


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 36

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

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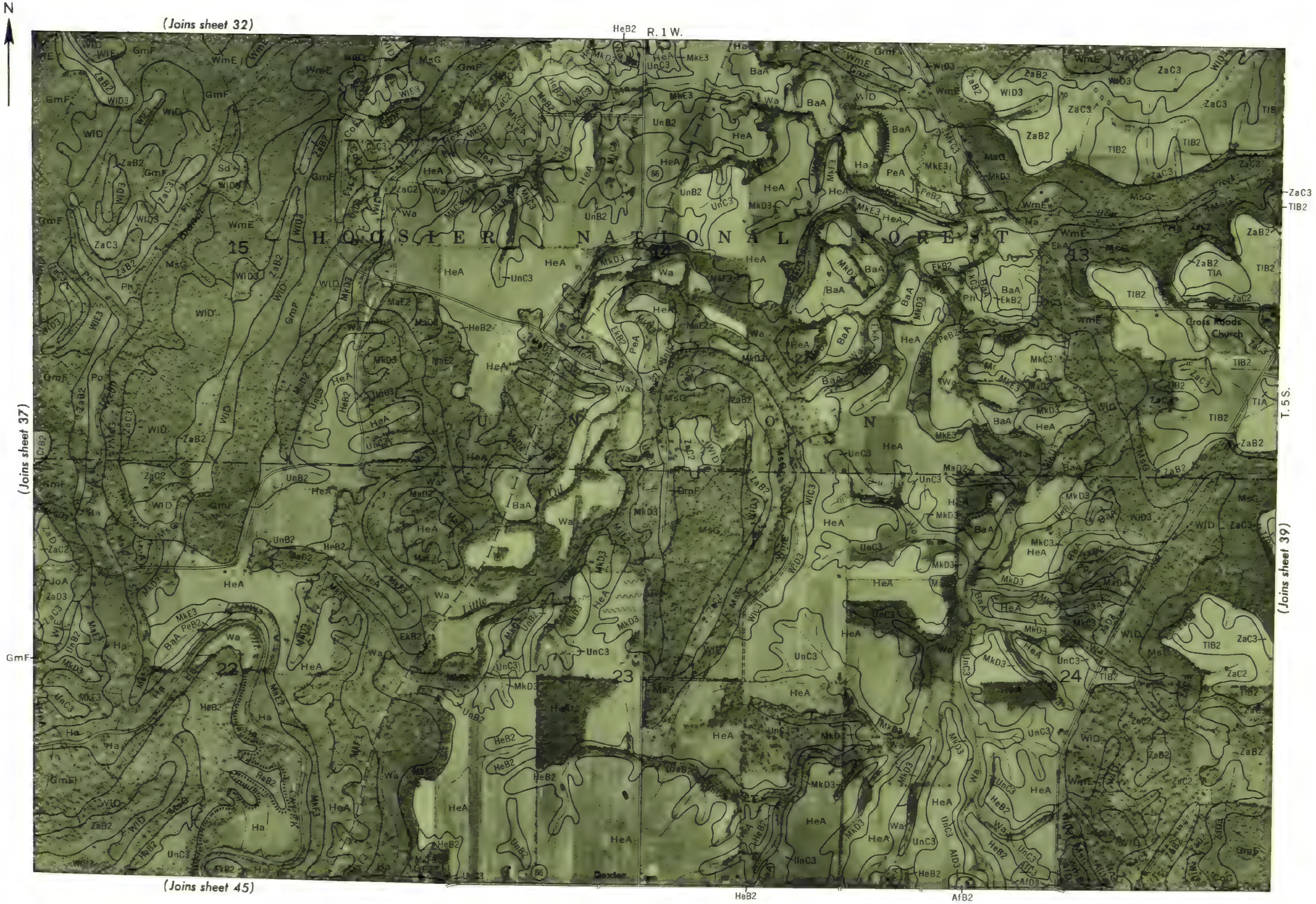
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 37

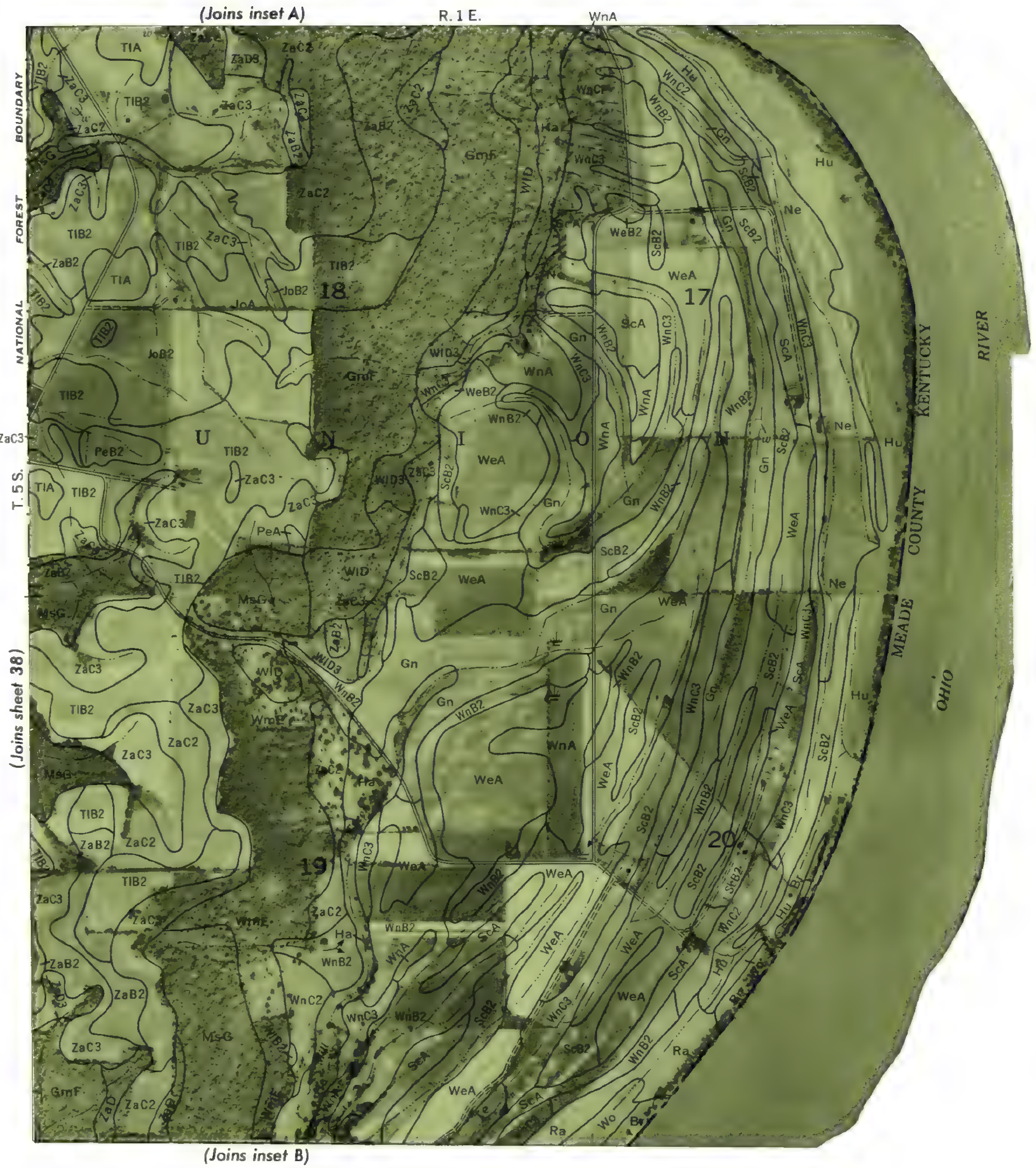


0 ½ Mile Scale 1:15 840 0 3 000 Feet

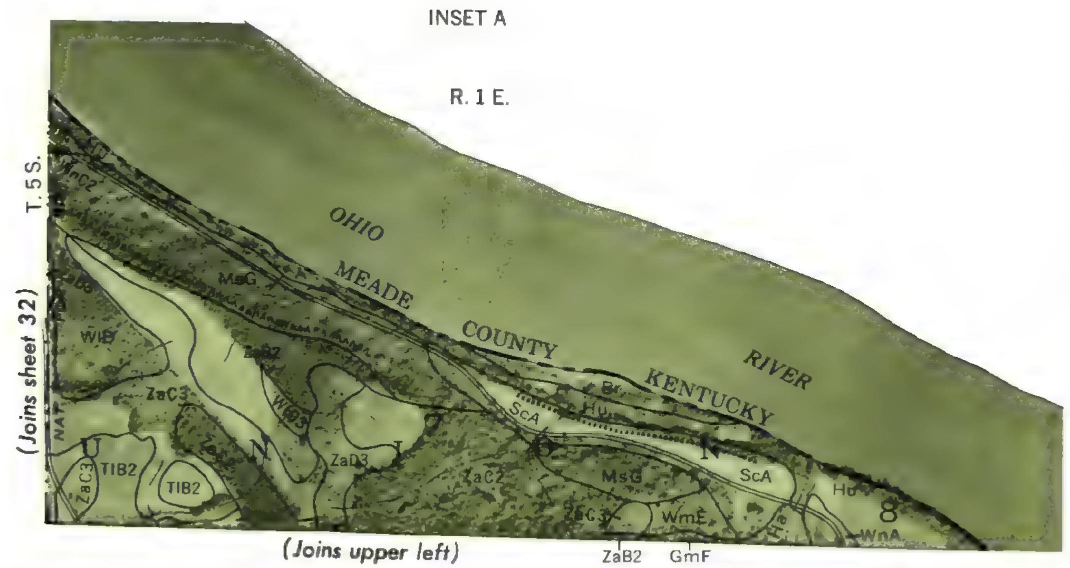
PERRY COUNTY, INDIANA NO. 38

Land division corners are approximately positioned on this map.

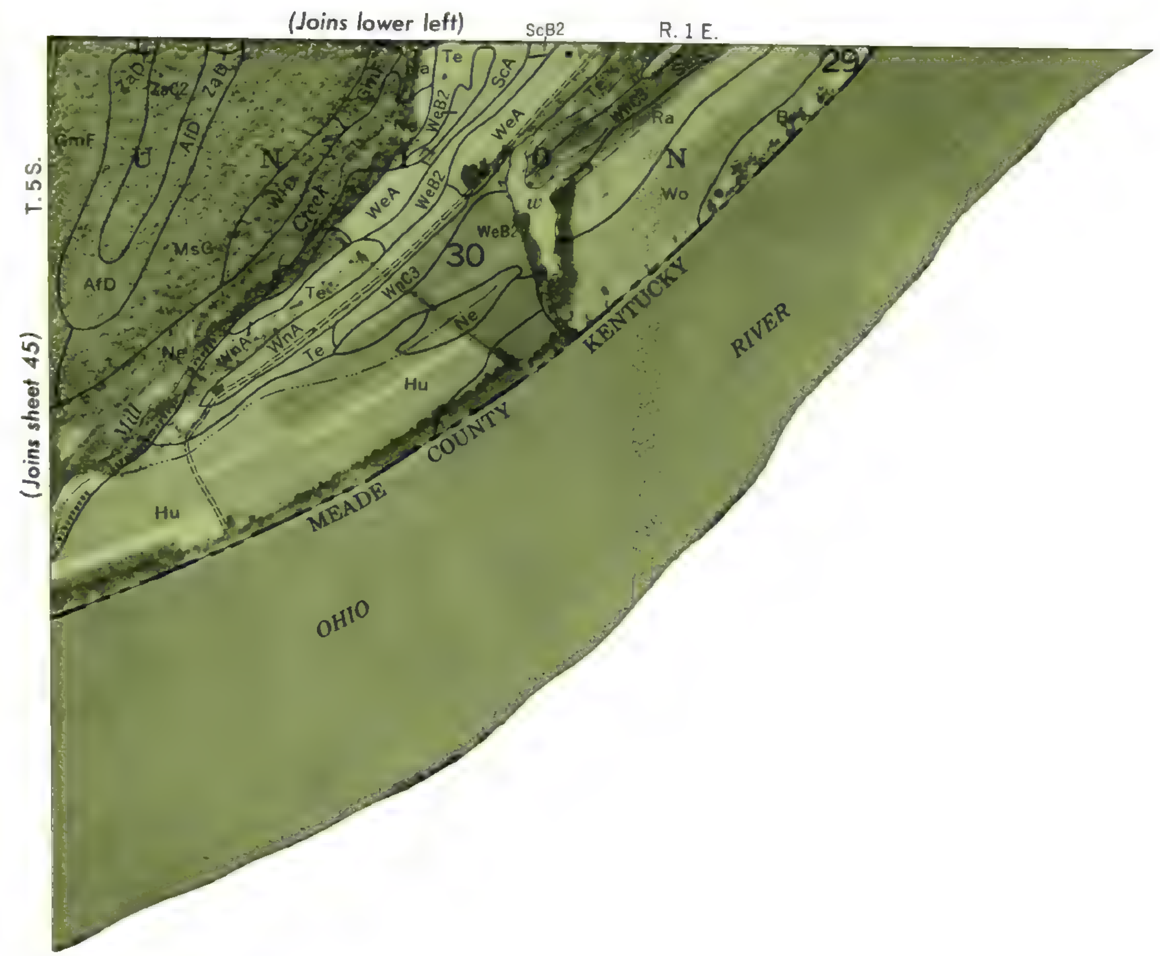
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



INSET A

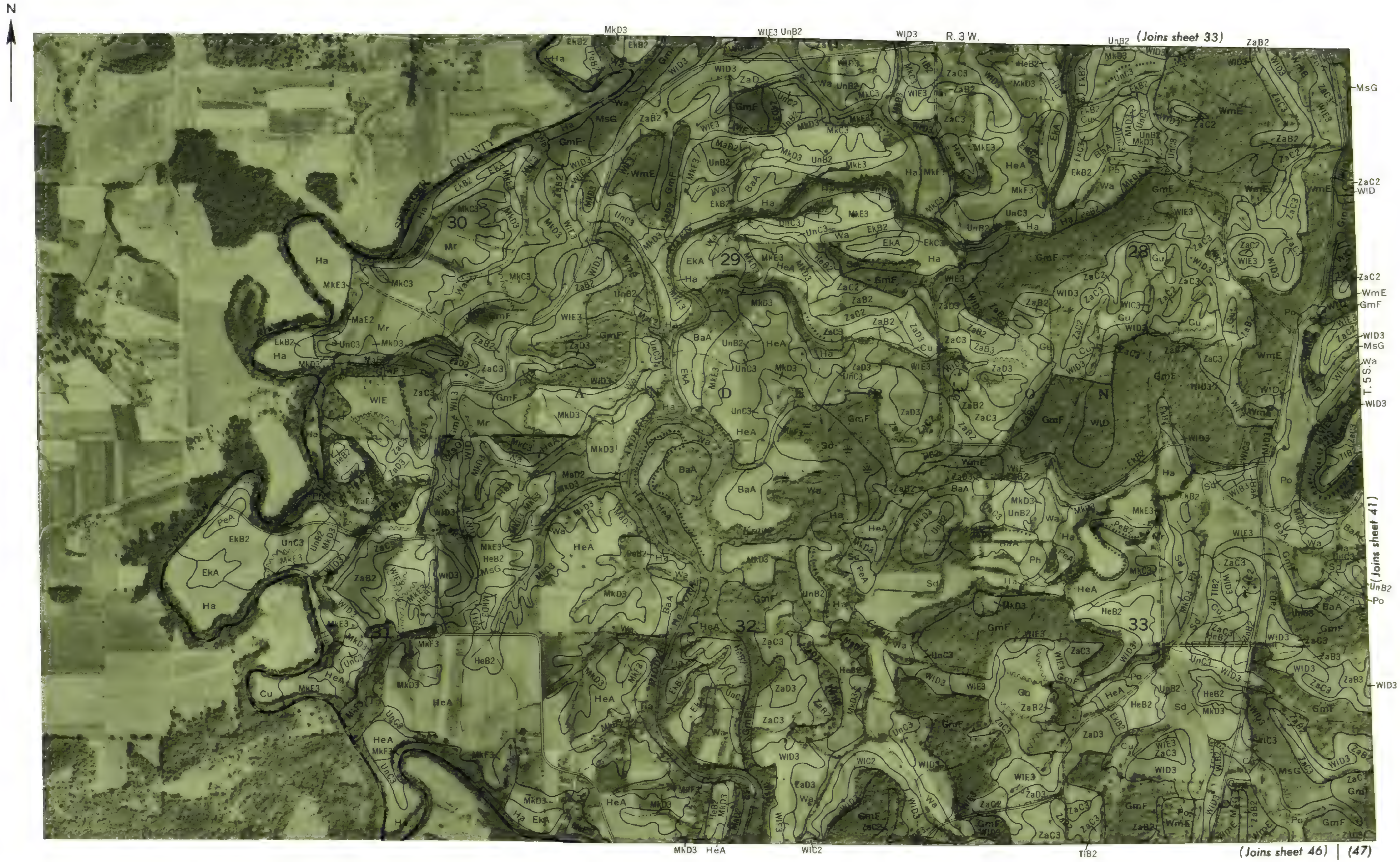


INSET B



0 ½ Mile Scale 1:15 840 0 3 000 Feet

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.
Land division corners are approximately positioned on this map.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 40

Land division corners are approximately positioned on this map.

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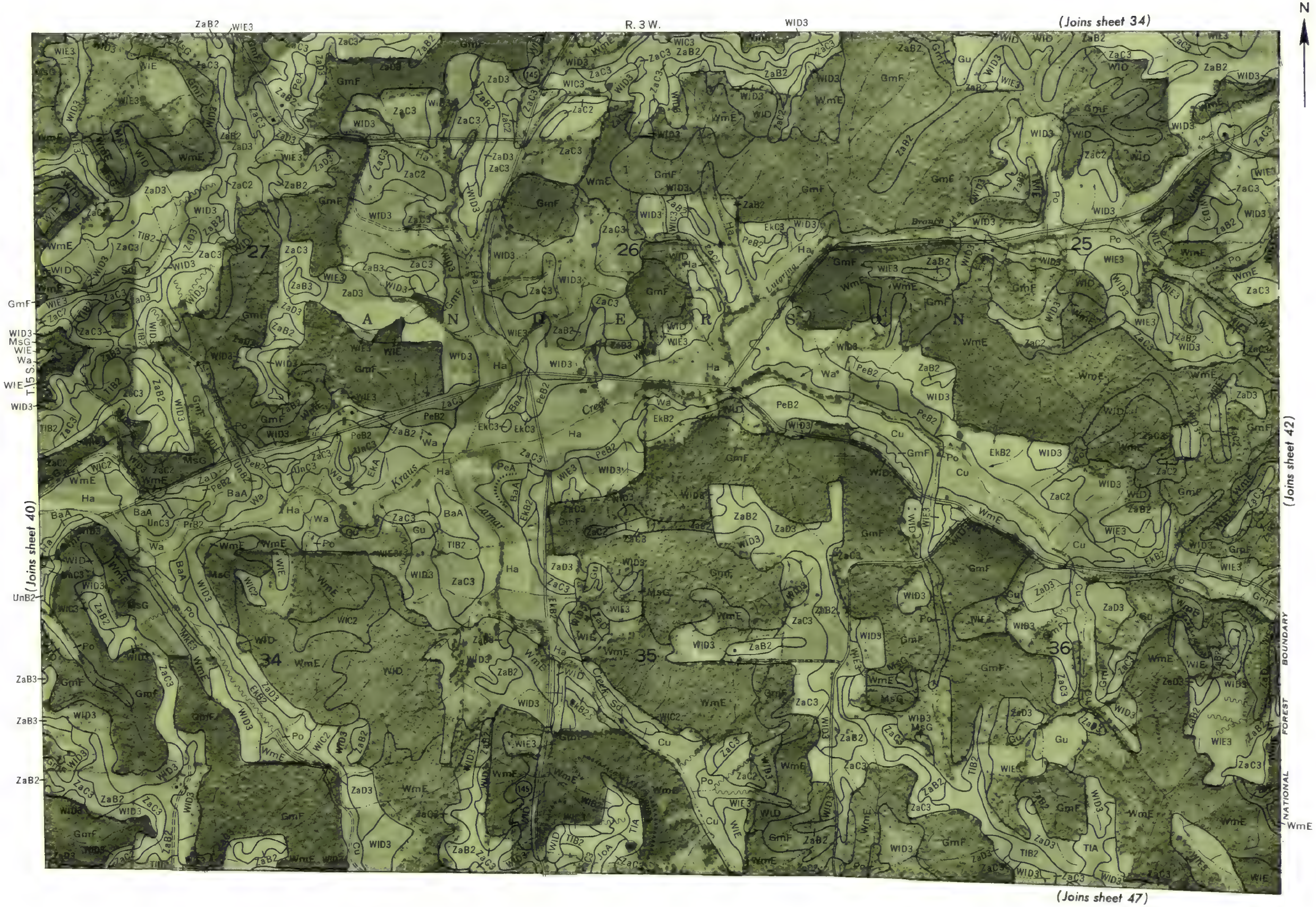
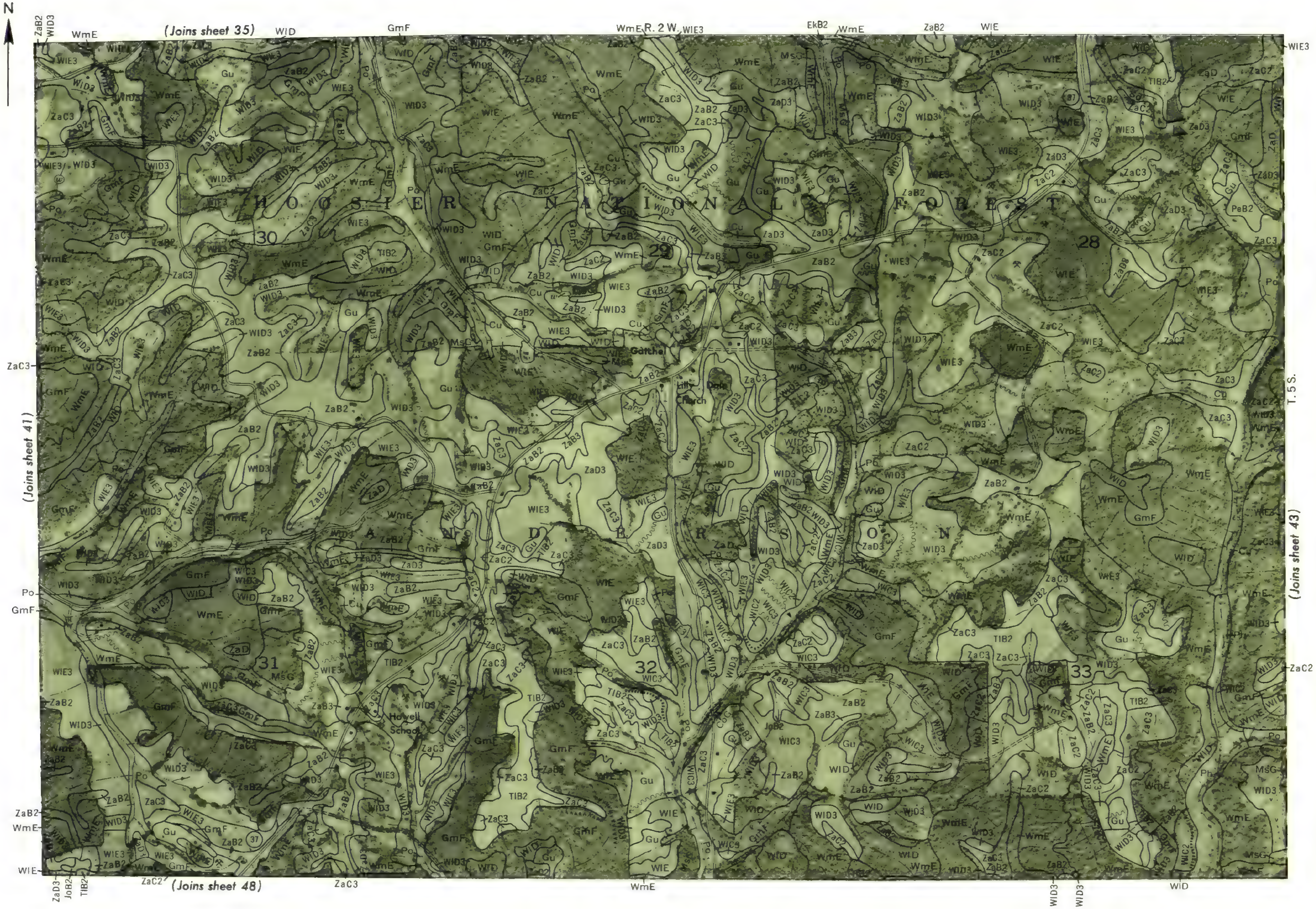


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 41

42

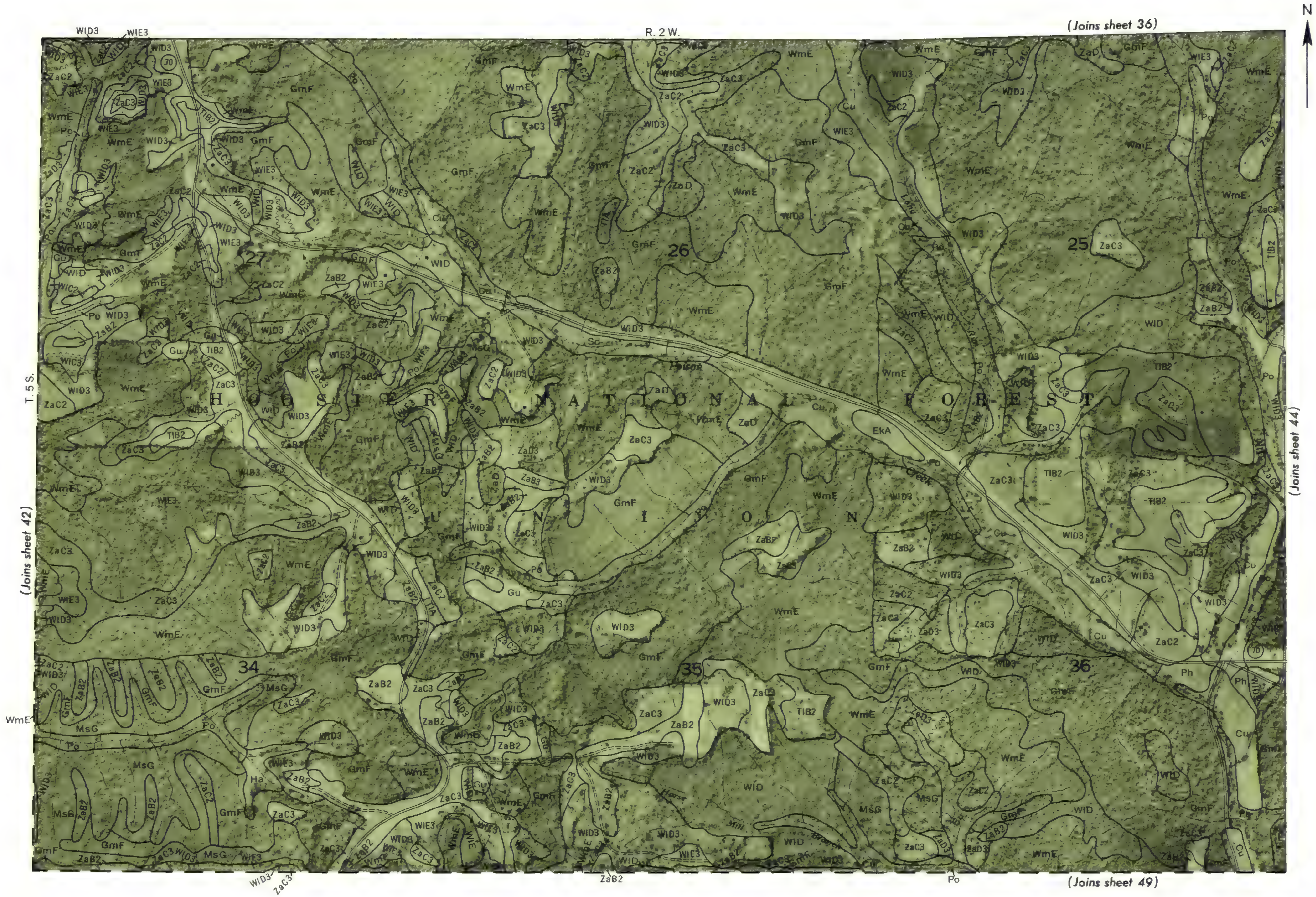


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 42

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 43

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.

PERRY COUNTY, INDIANA — SHEET NUMBER 44

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 44

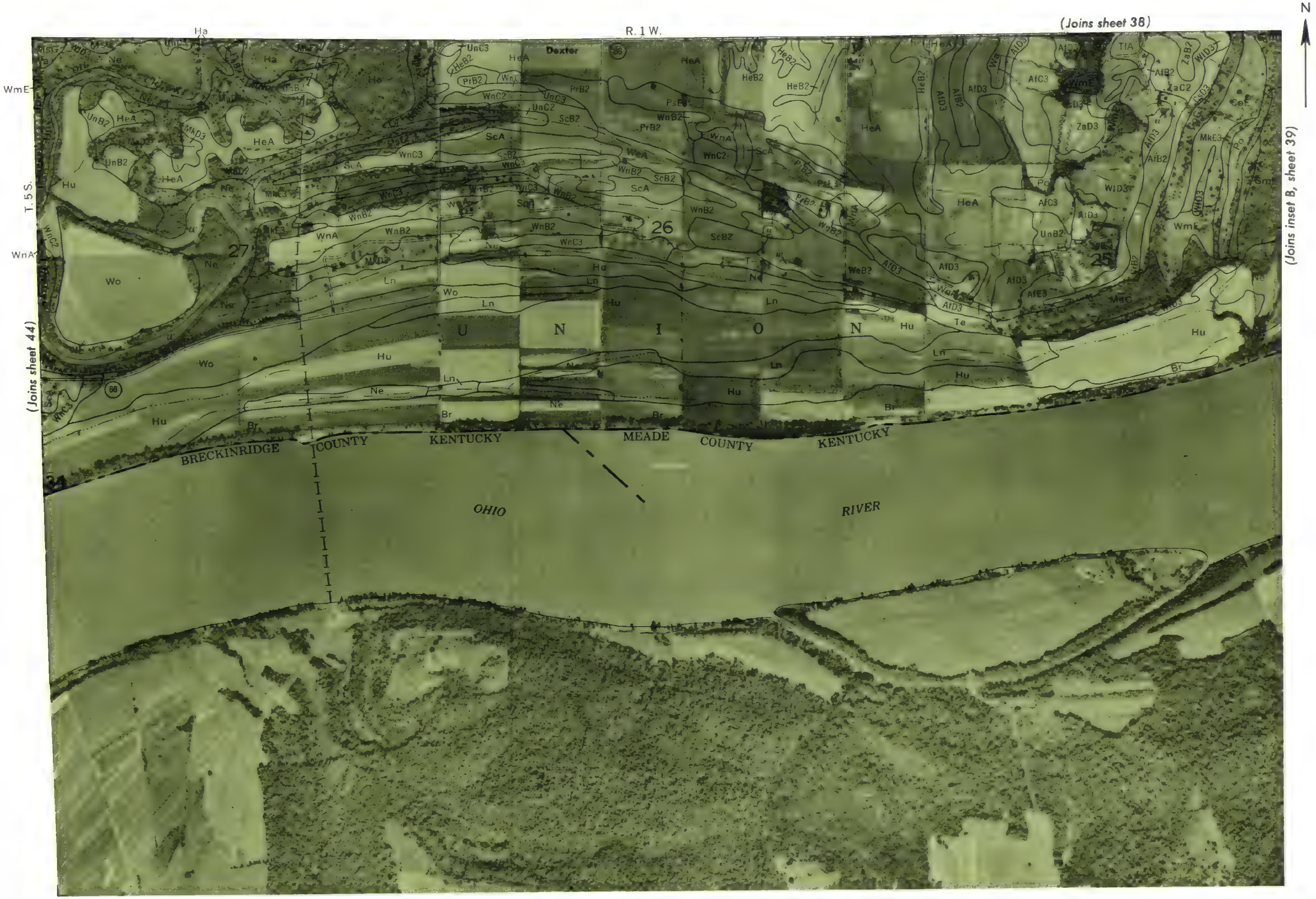
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.

45

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 45



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 46

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 46

Land division corners are approximately positioned on this map.

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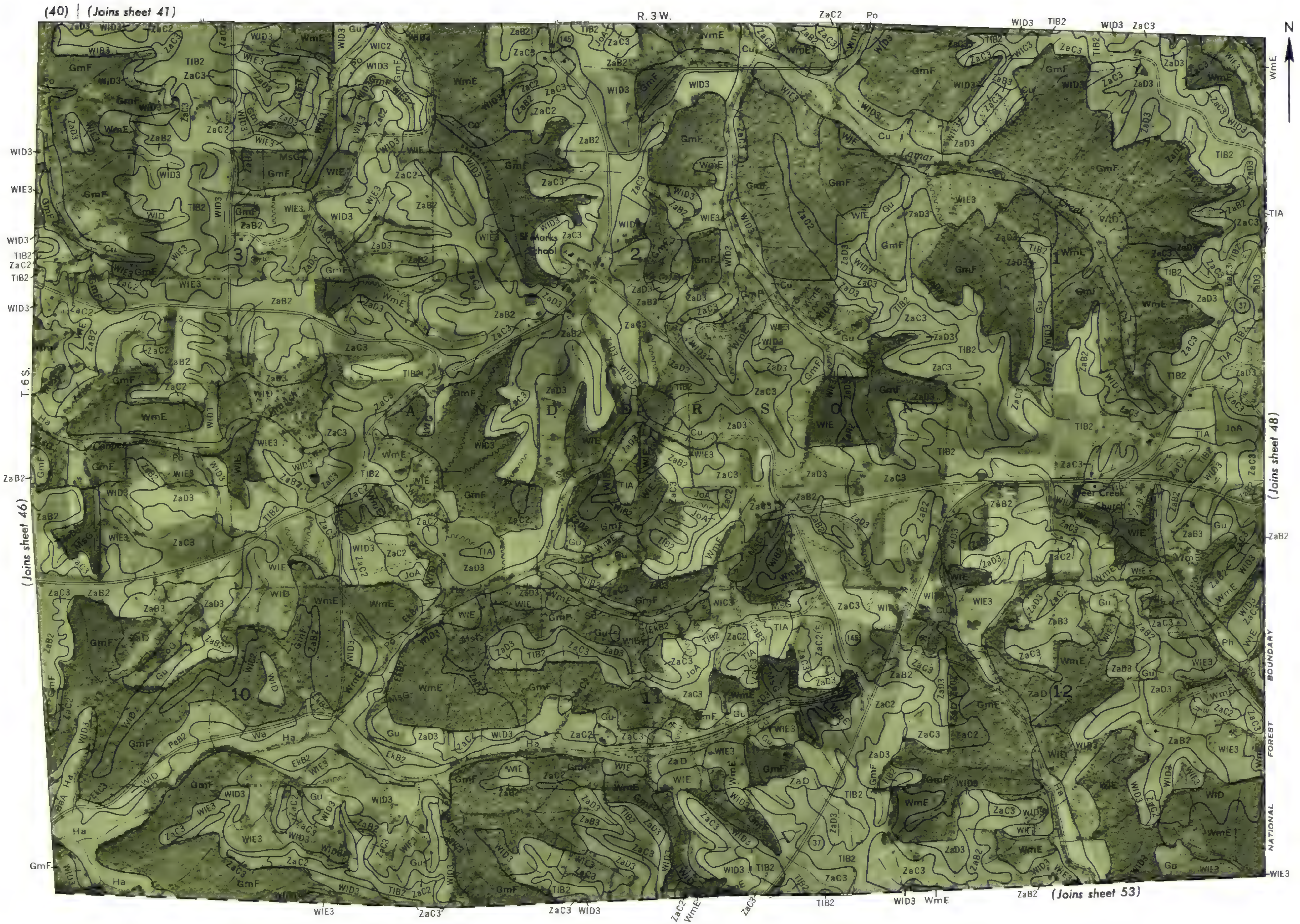
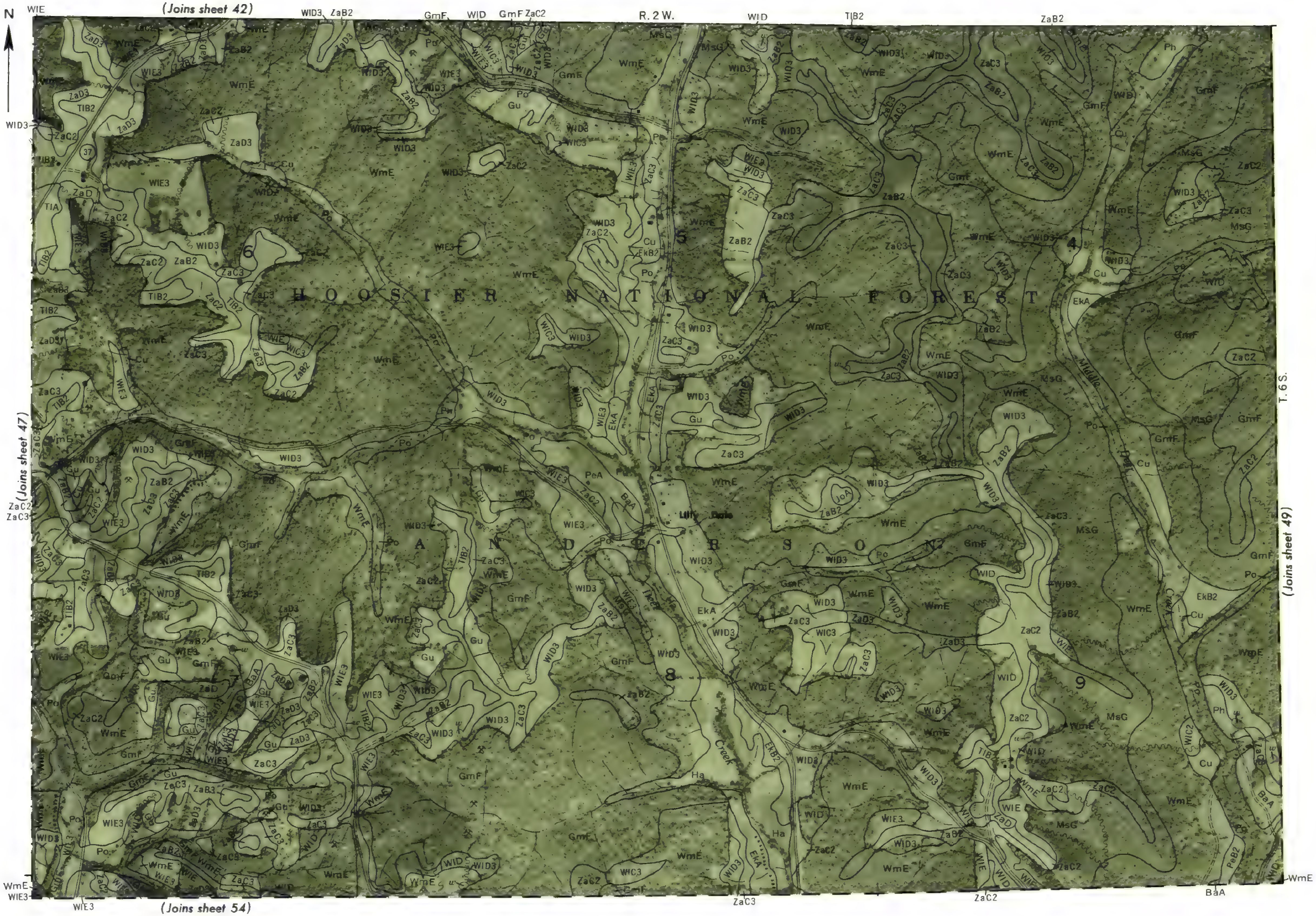
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 47



0 ½ Mile Scale 1:15 840 0 3 000 Feet

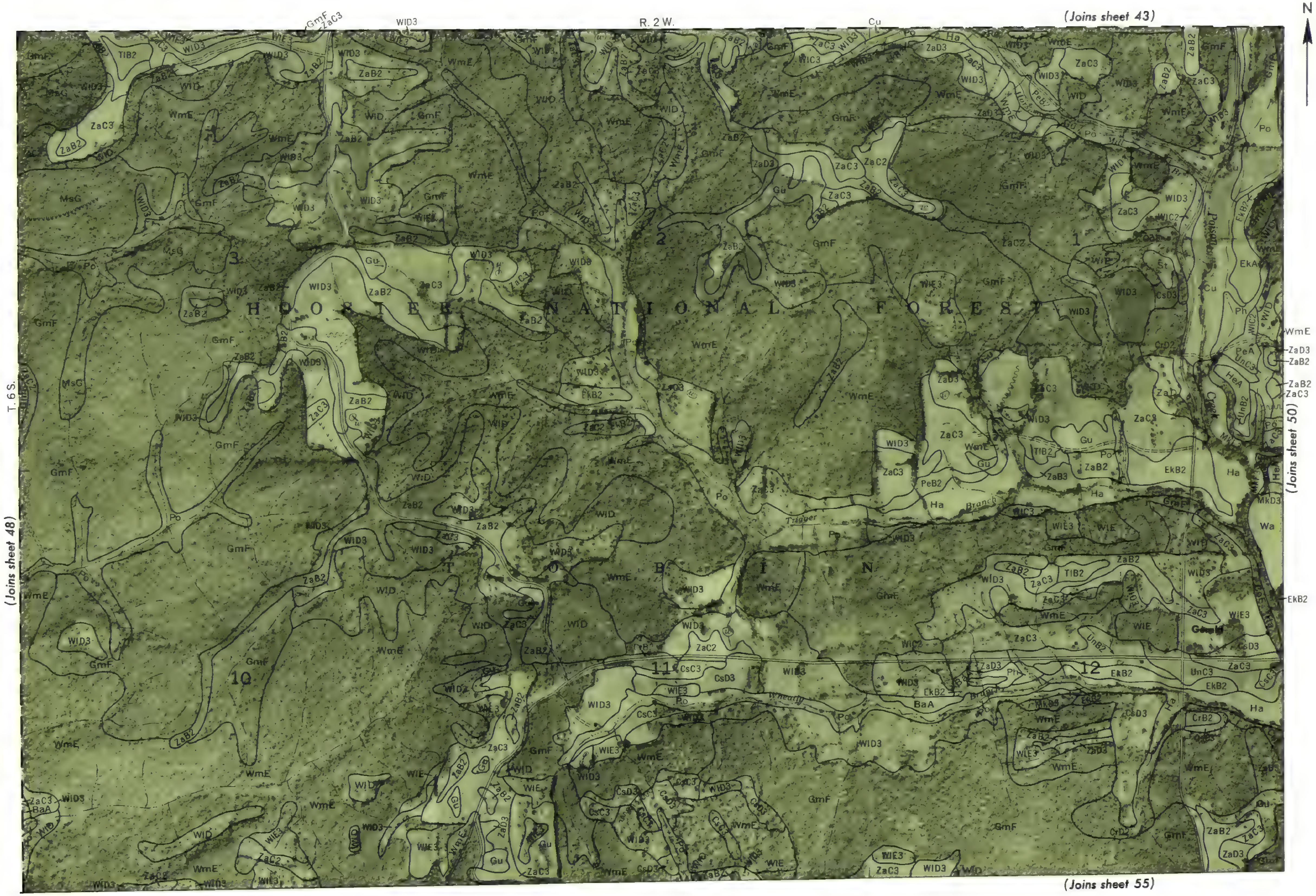


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 48

Land division corners are approximately positioned on this map.

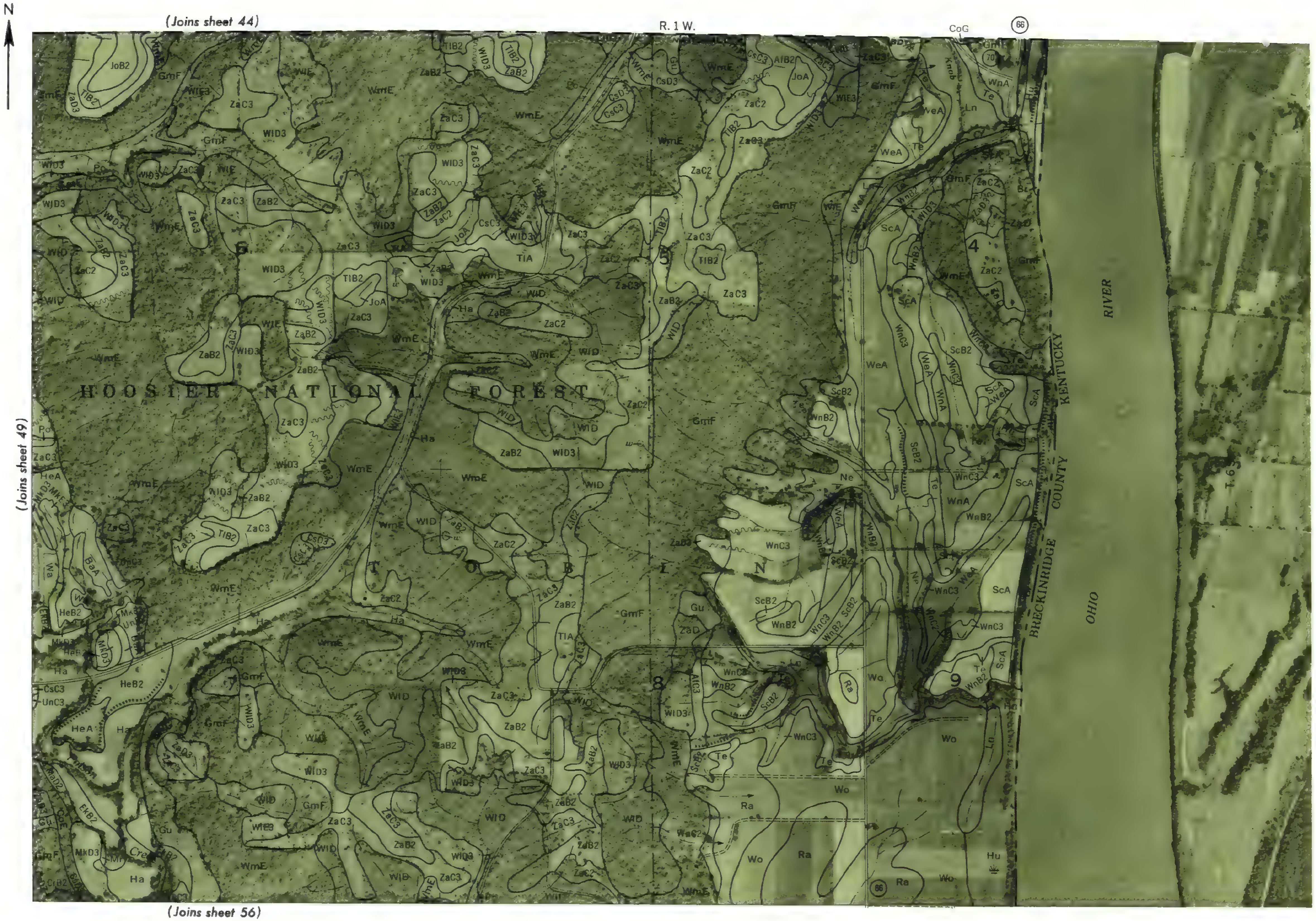
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 49

(50)



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 50

Land division corners are approximately positioned on this map.

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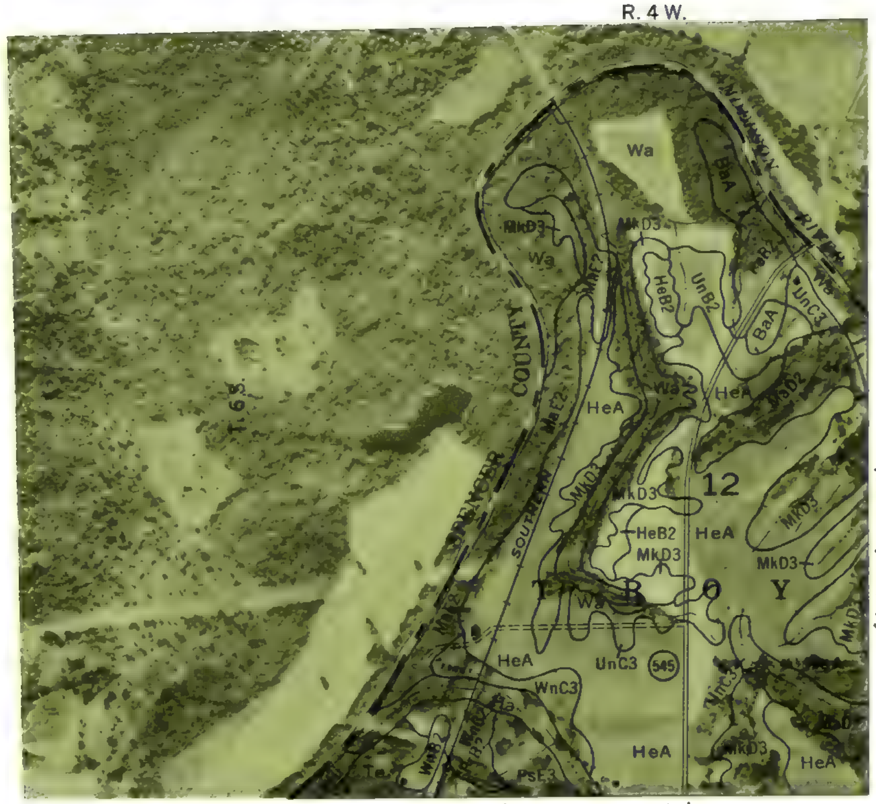
R. 4 W.

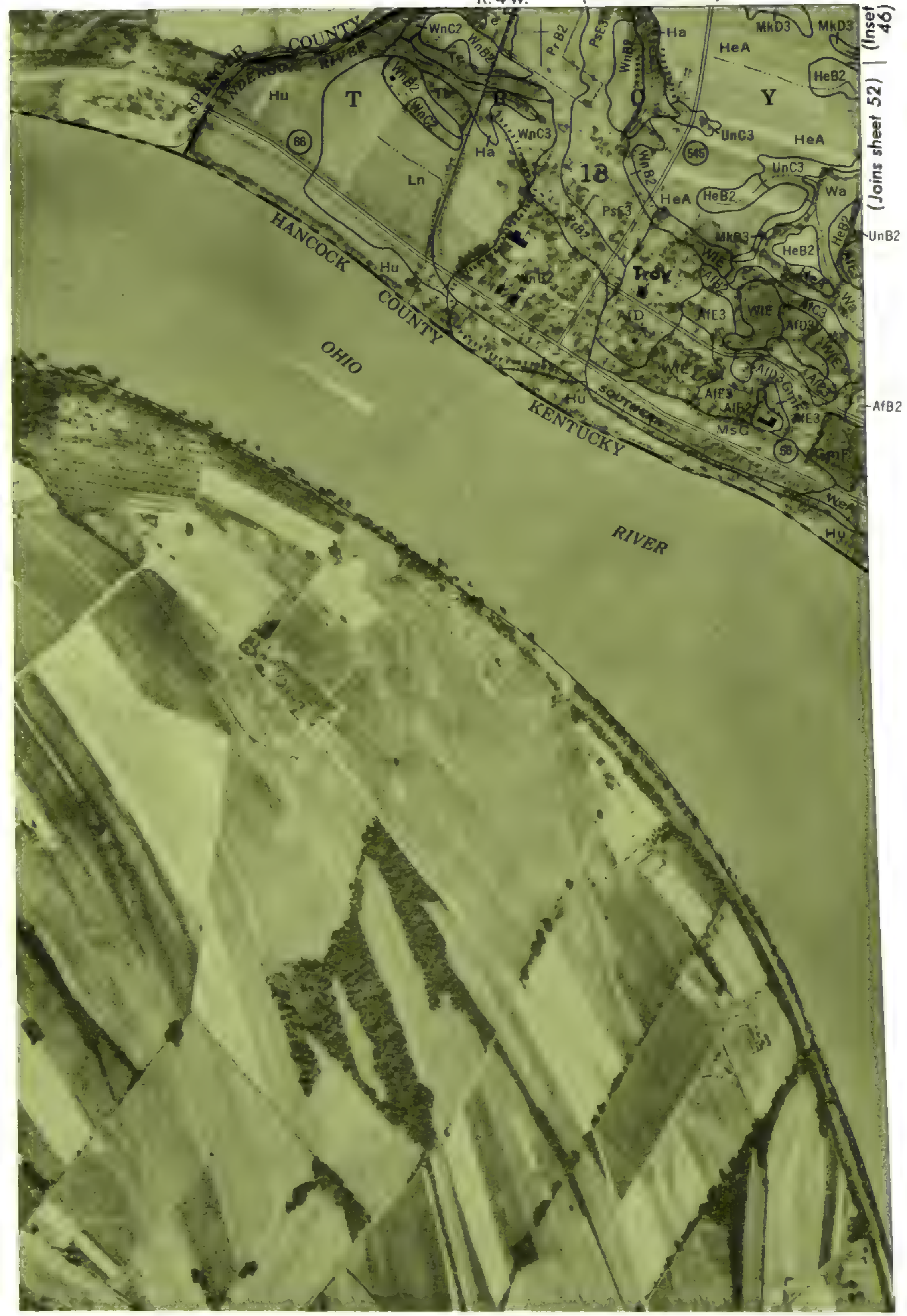


(Joins upper right)

(Joins sheet 46)

R. 4 W. (Joins lower left)

T. 6 S.



(Inset 46)

(Joins sheet 52)

UnB2

AfB2

N

0 ½ Mile

Scale 1:15 840

0 3 000 Feet

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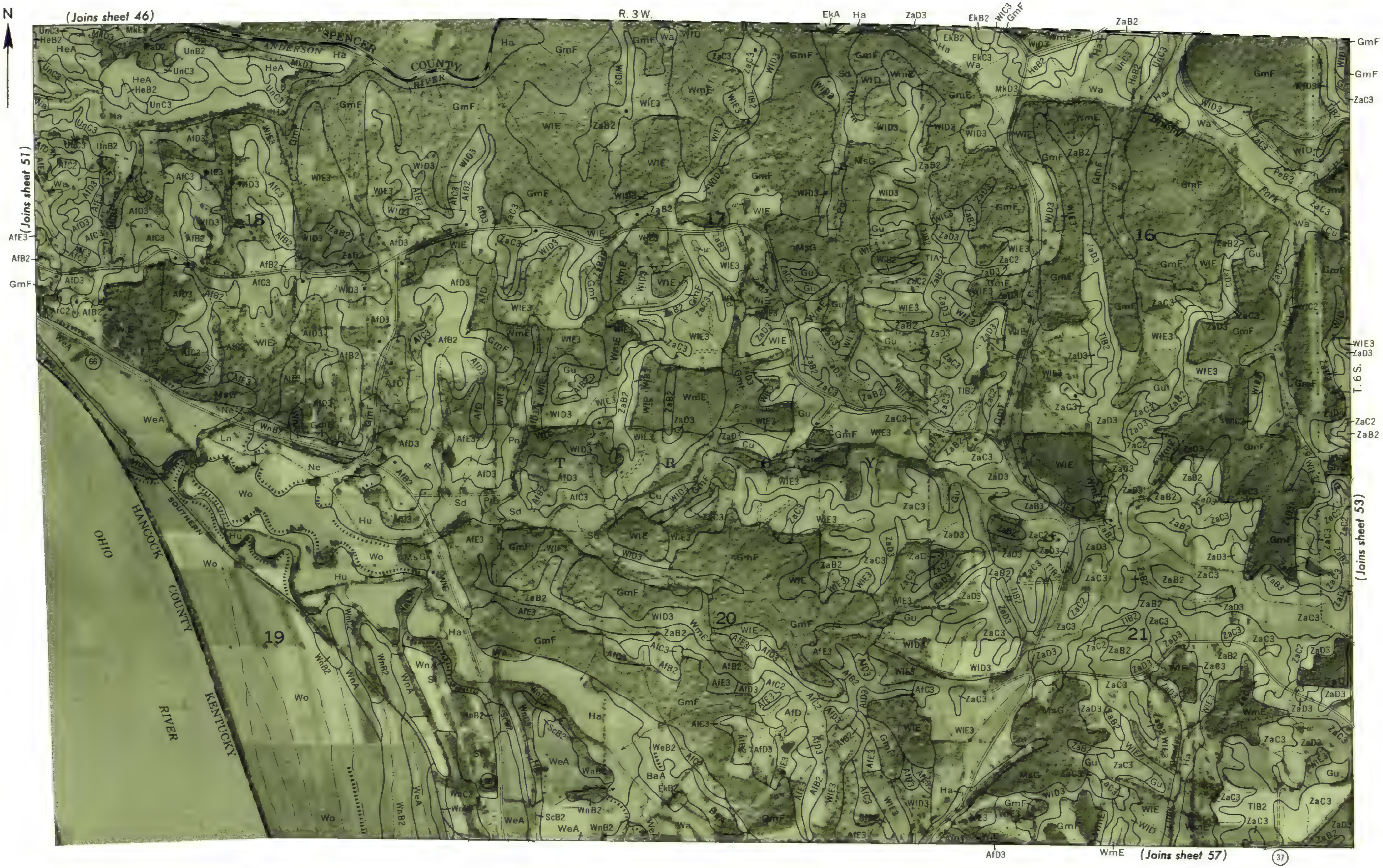
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 51



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 52

Land division corners are approximately positioned on this map.

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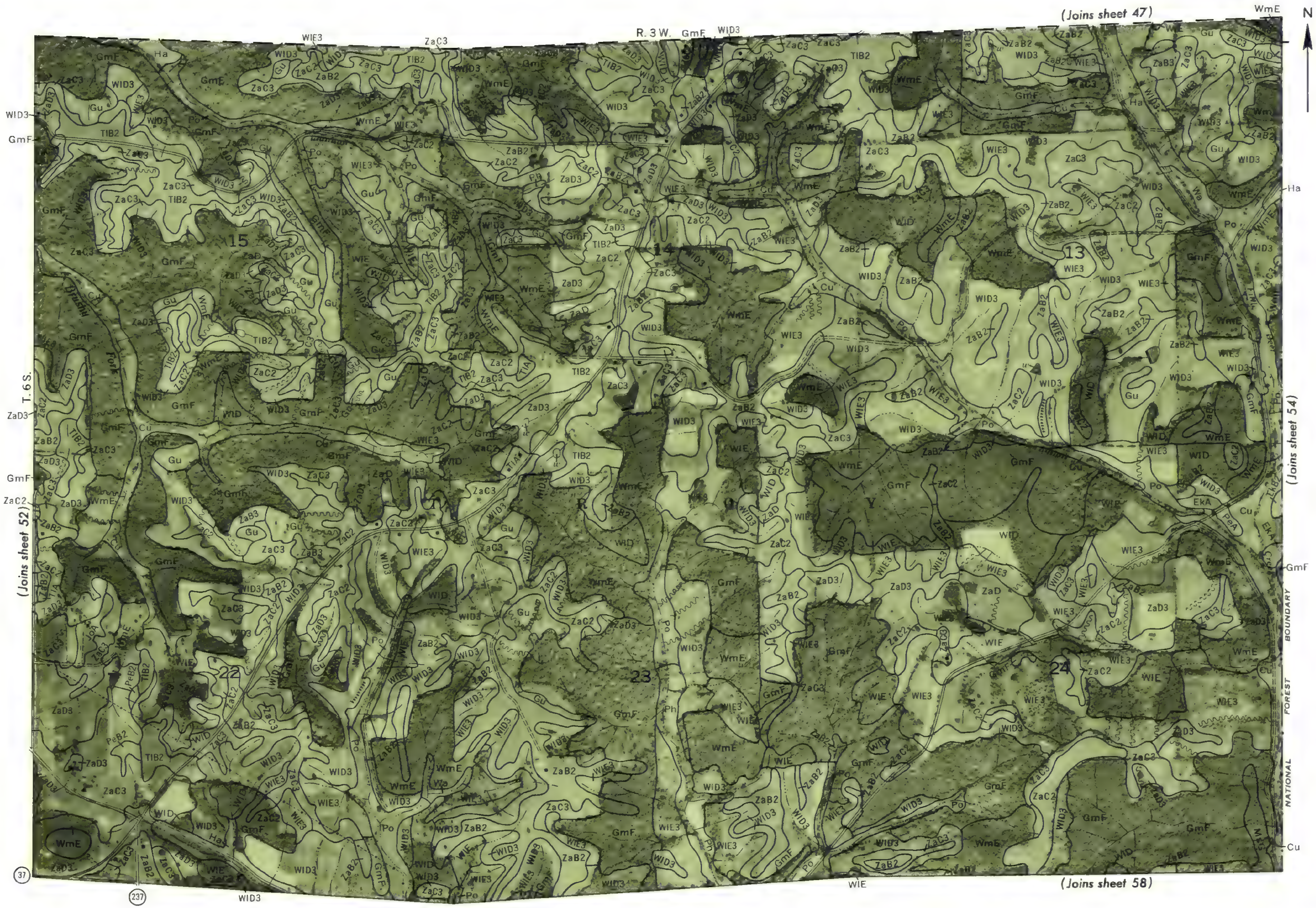
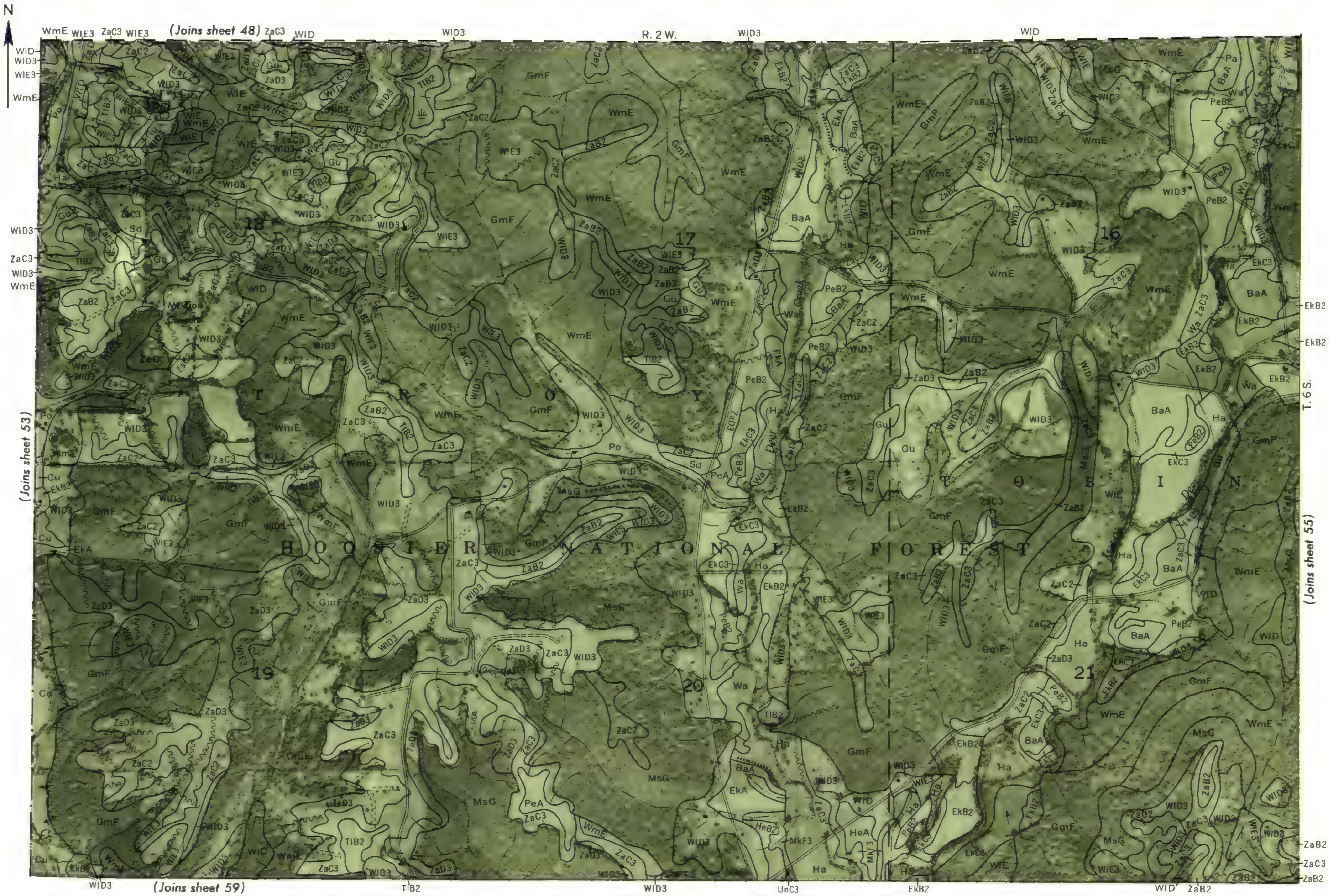
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 53



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 54

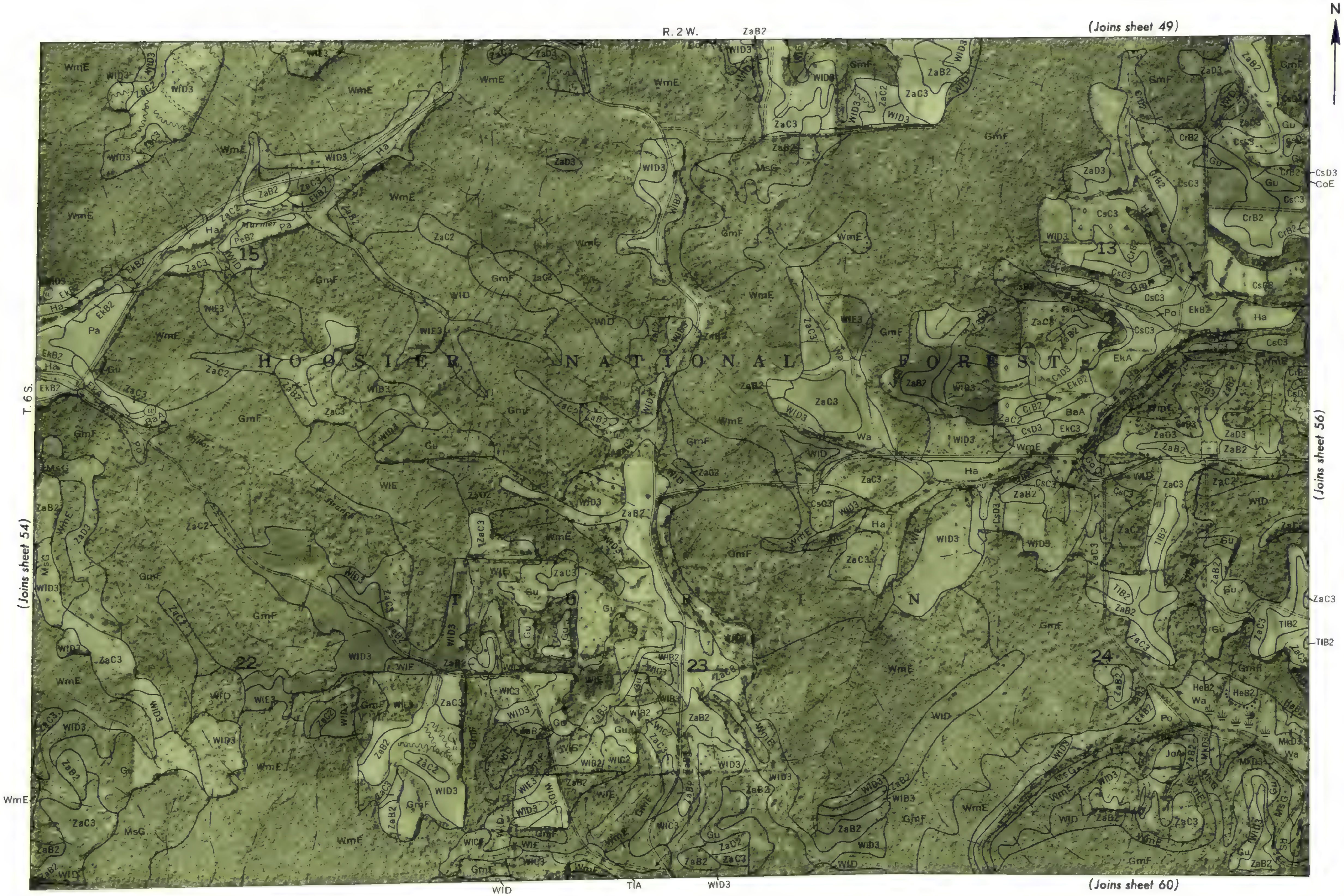


0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 54

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, and the Purdue University Agricultural Experiment Station.



0 ½ Mile Scale 1:15 840 0 3 000 Feet

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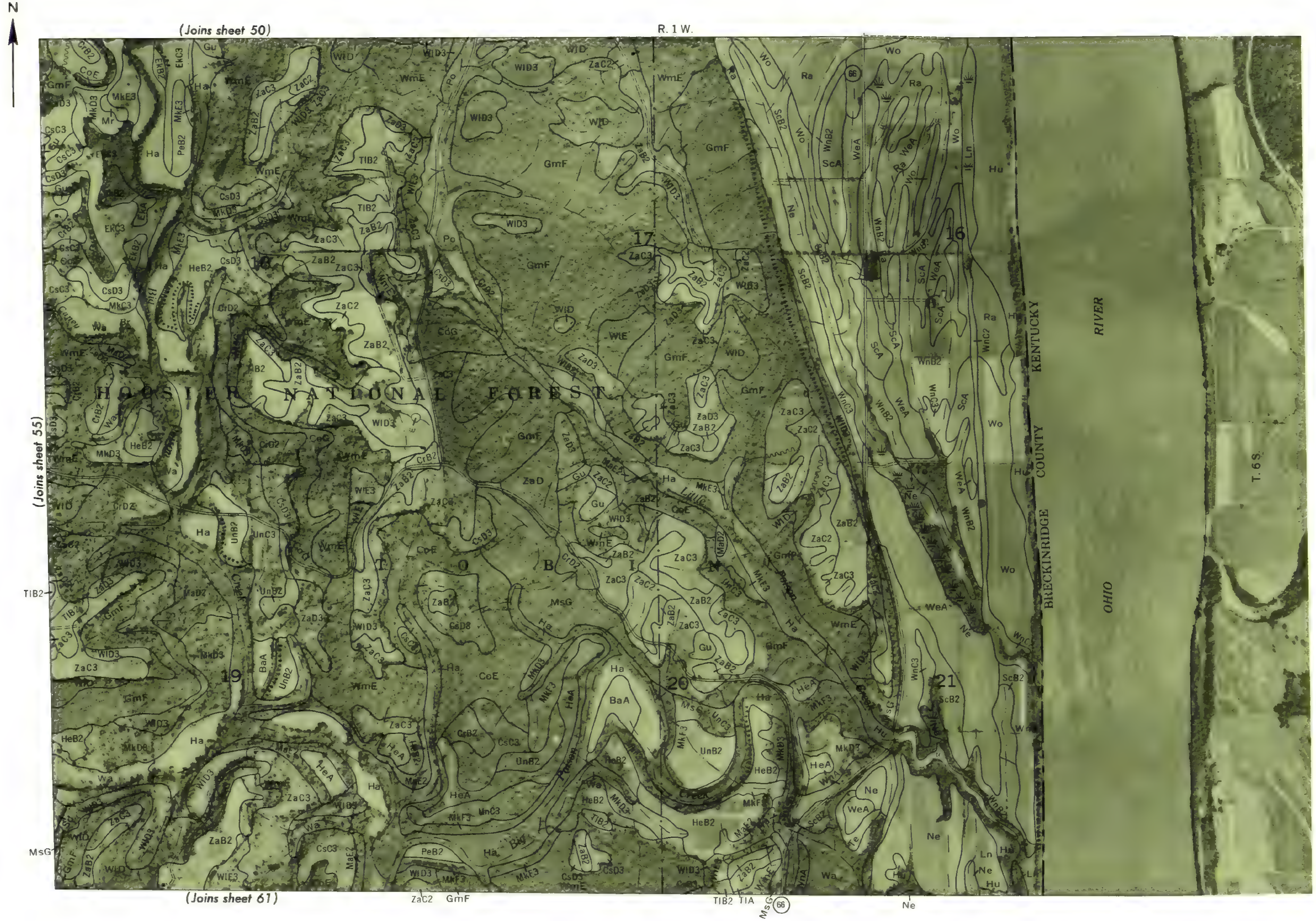
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 55

PERRY COUNTY, INDIANA — SHEET NUMBER 56



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 56

Land division corners are approximately positioned on this map.

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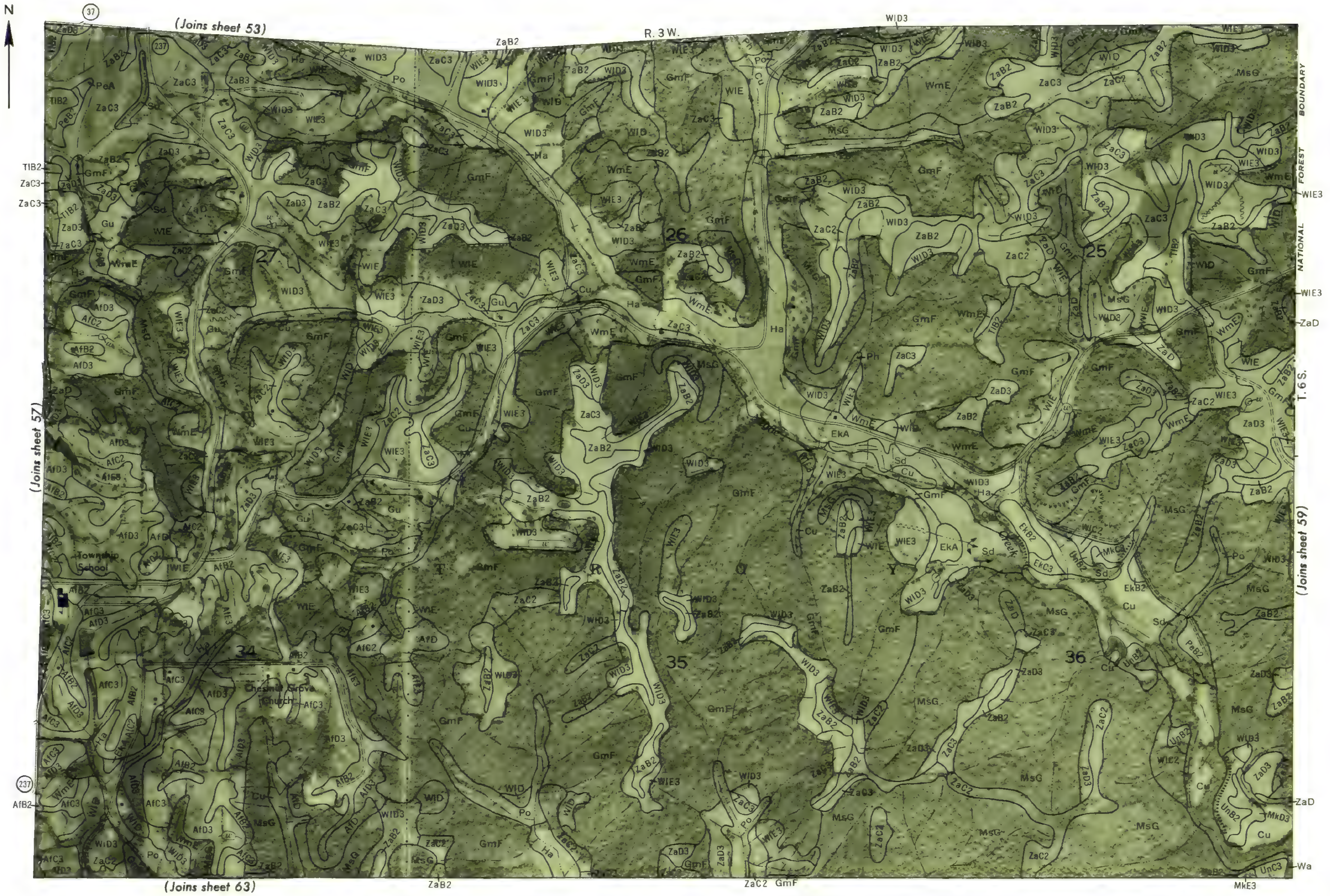
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 57

T. 6 S.

0 ½ Mile Scale 1:15 840 0 3 000 Feet



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 58

Land division corners are approximately positioned on this map.

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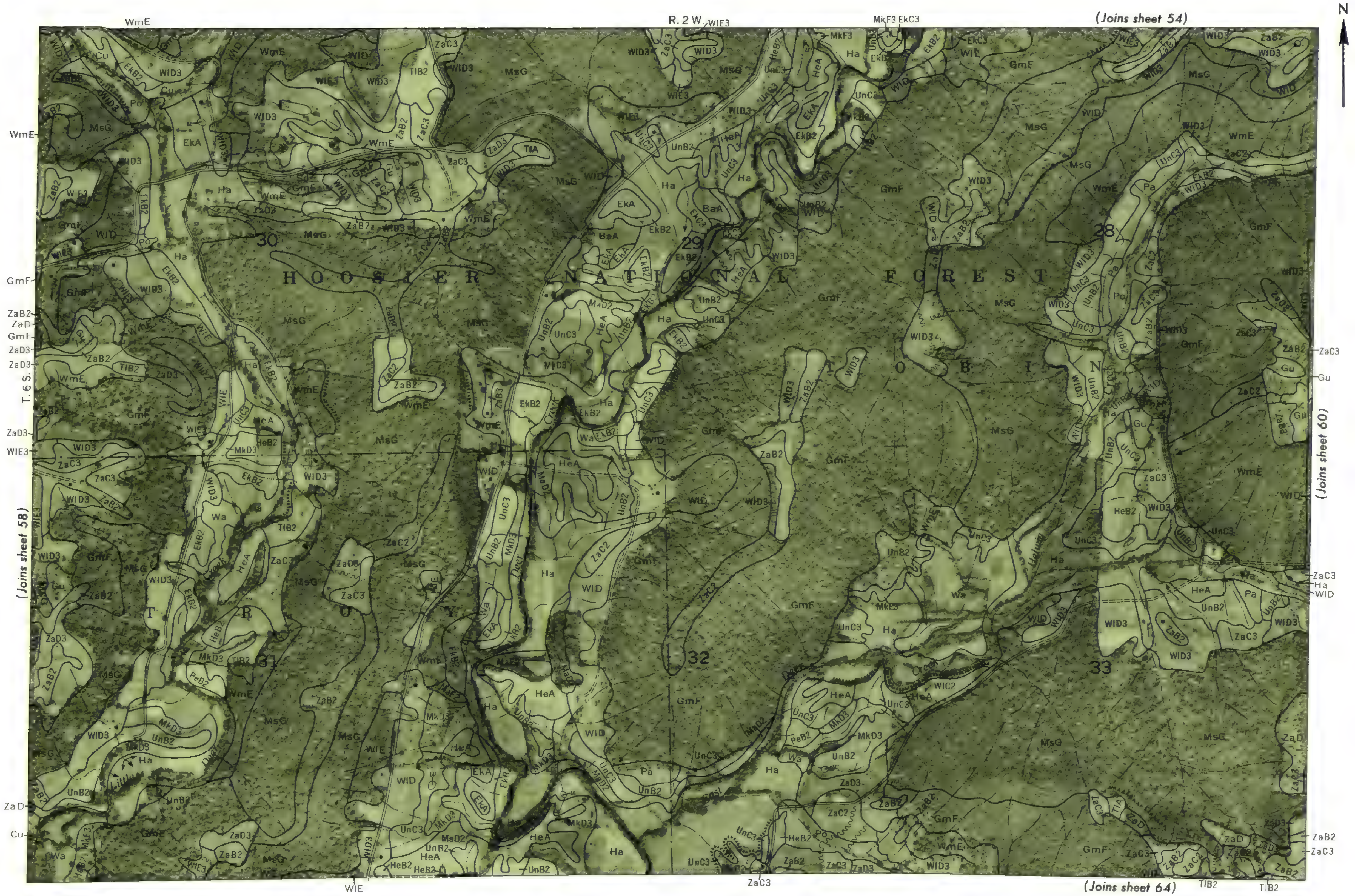
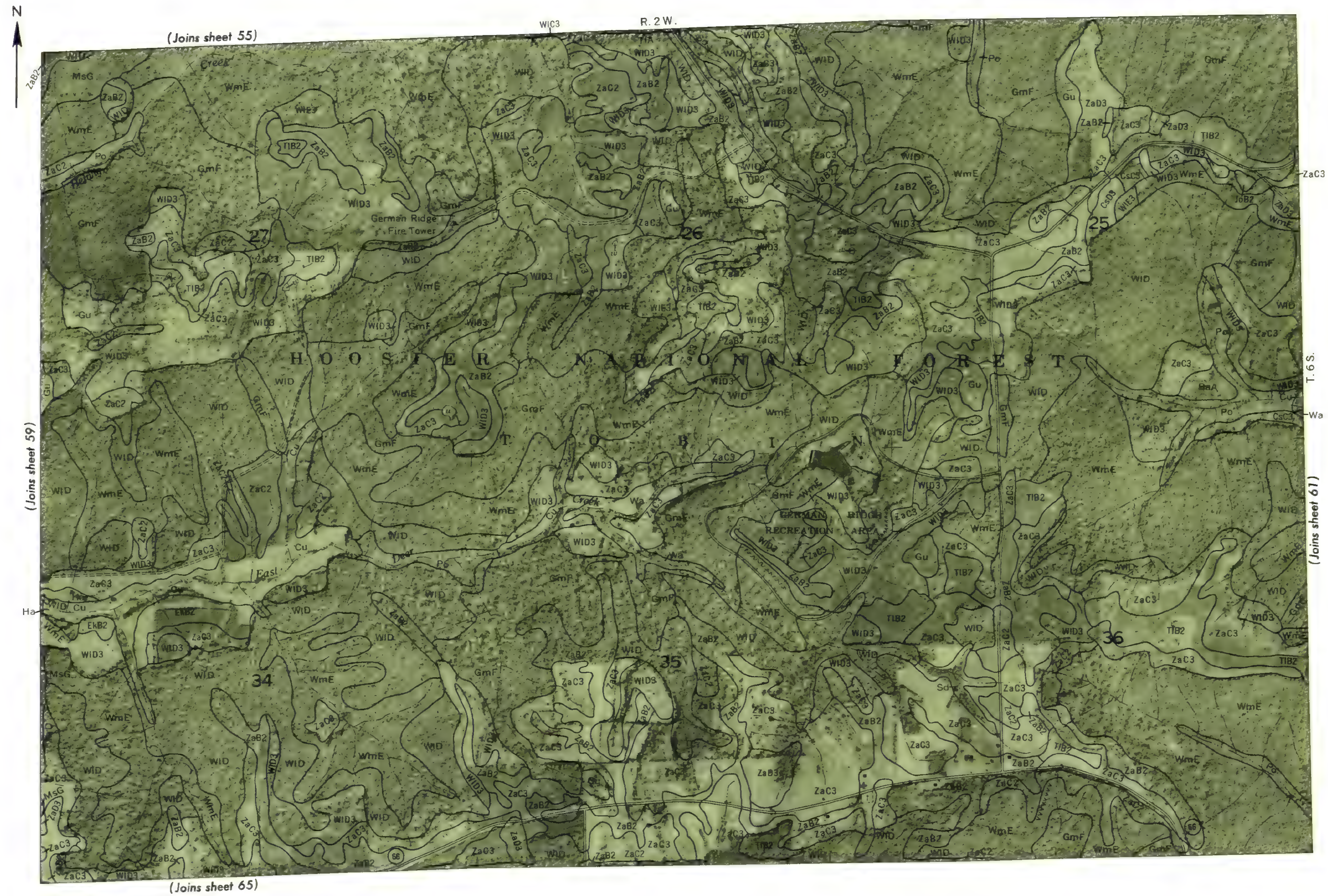
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 59



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 60



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 60

Land division corners are approximately positioned on this map.

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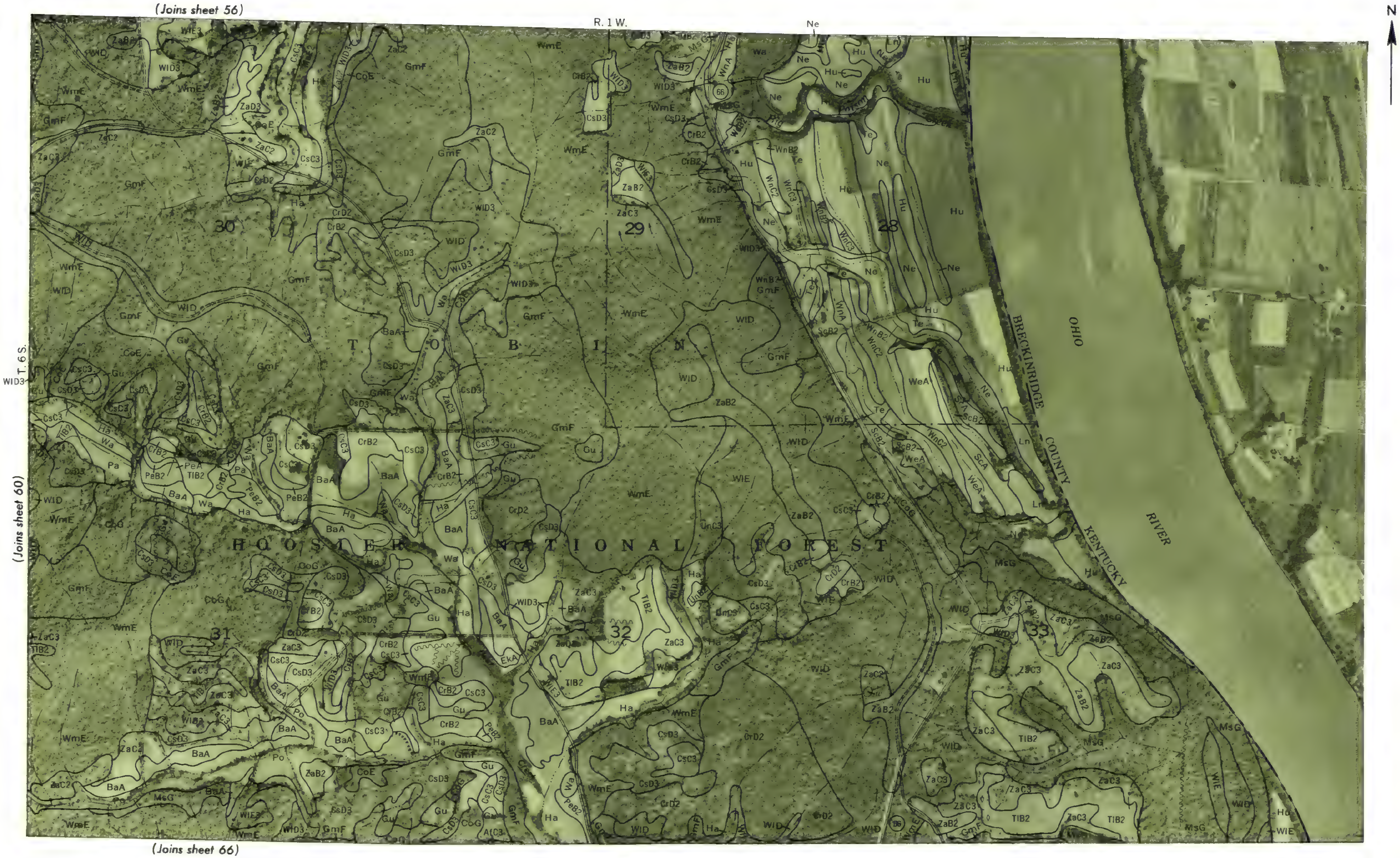
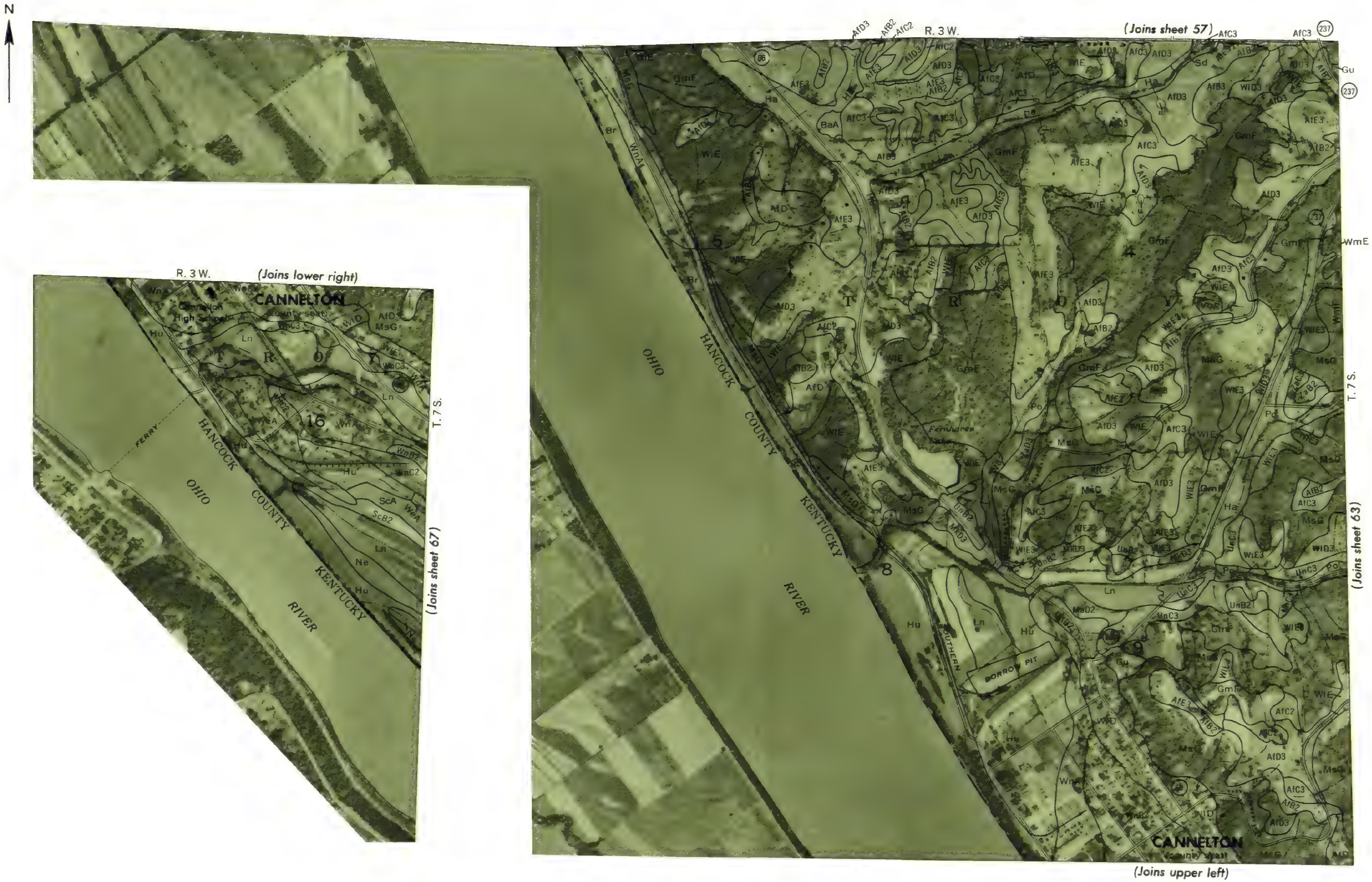
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 61



0 ½ Mile Scale 1:15 840 0 3 000 Feet



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 62

Land division corners are approximately positioned on this map.

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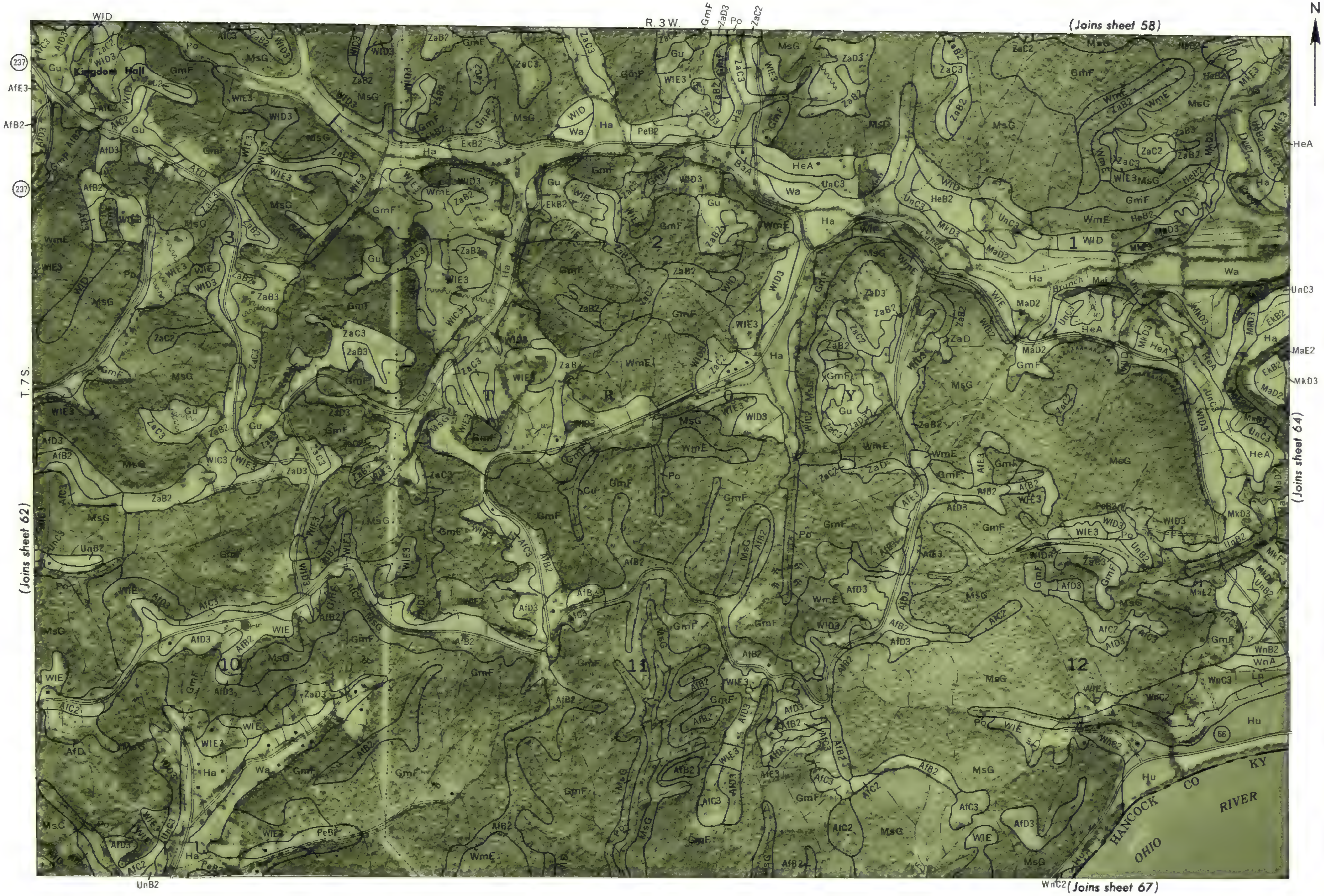

0 ½ Mile Scale 1:15 840 0 3 000 Feet

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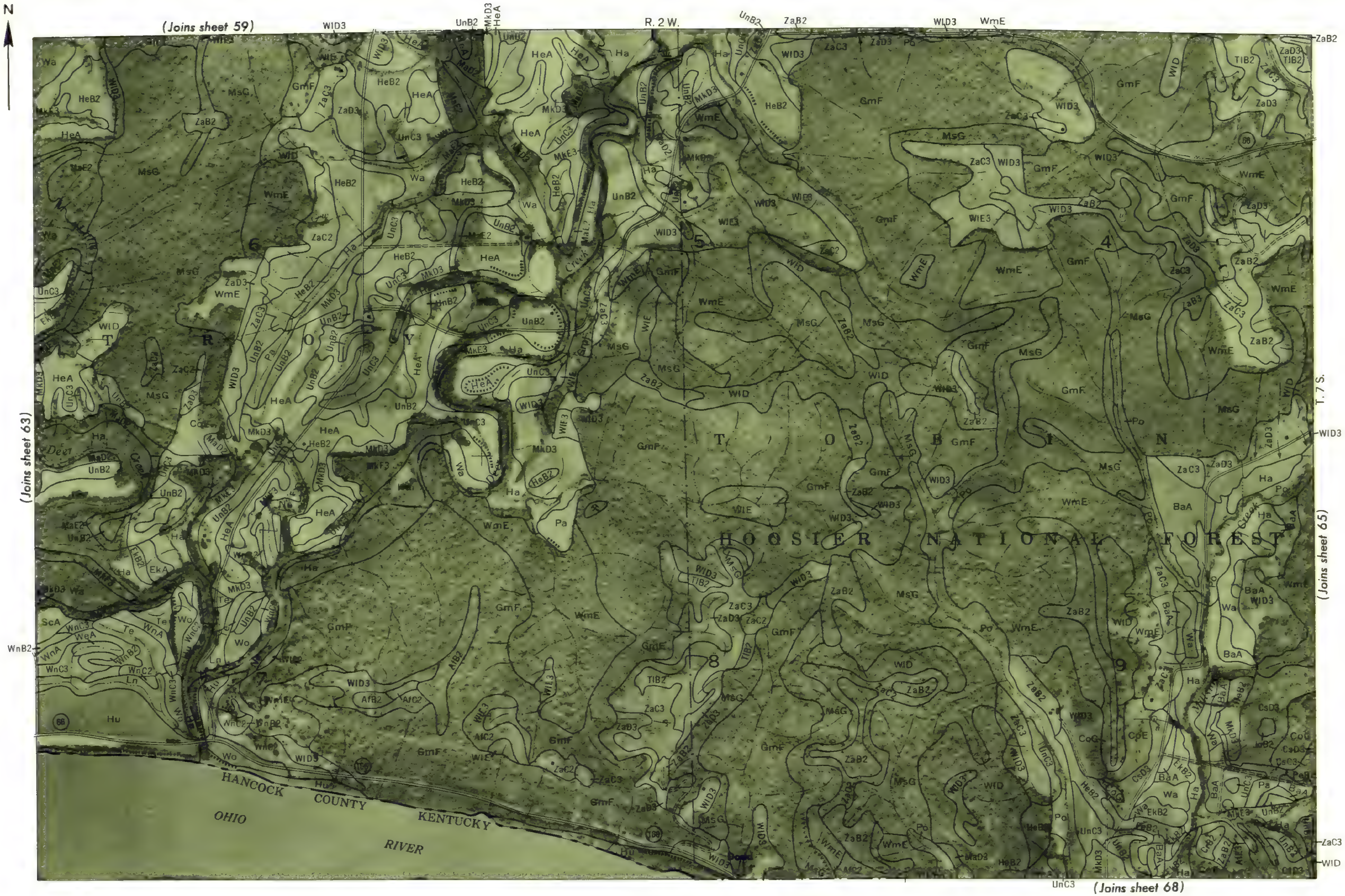
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 63

PERRY COUNTY, INDIANA — SHEET NUMBER 64



0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 64

Land division corners are approximately positioned on this map.

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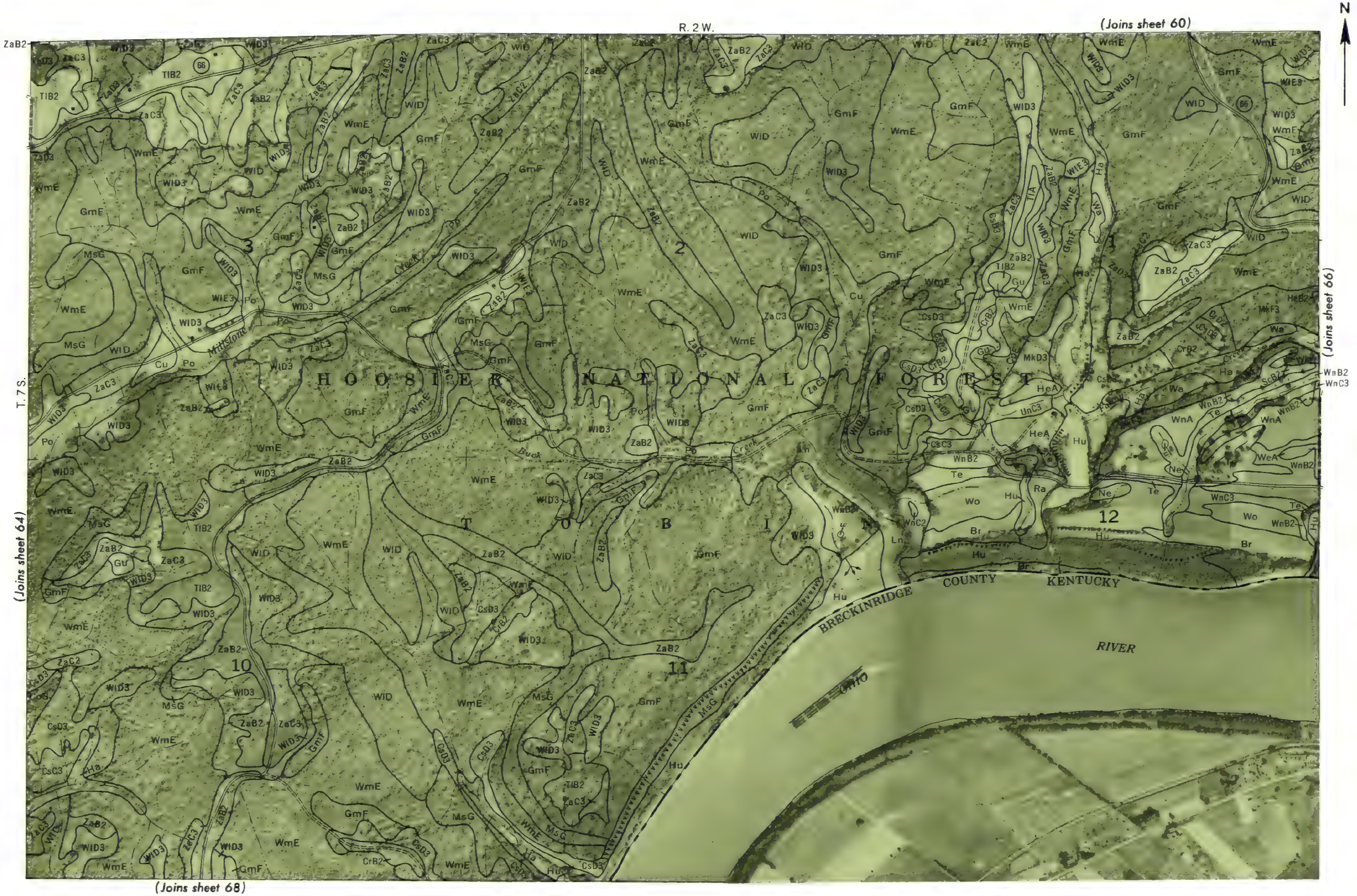

0 ½ Mile Scale 1:15 840 0 3 000 Feet

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Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 65

PERRY COUNTY, INDIANA — SHEET NUMBER 66

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 66

Land division corners are approximately positioned on this map.

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Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 67

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA — SHEET NUMBER 68

0 ½ Mile Scale 1:15 840 0 3 000 Feet

PERRY COUNTY, INDIANA NO. 68

Land division corners are approximately positioned on this map.

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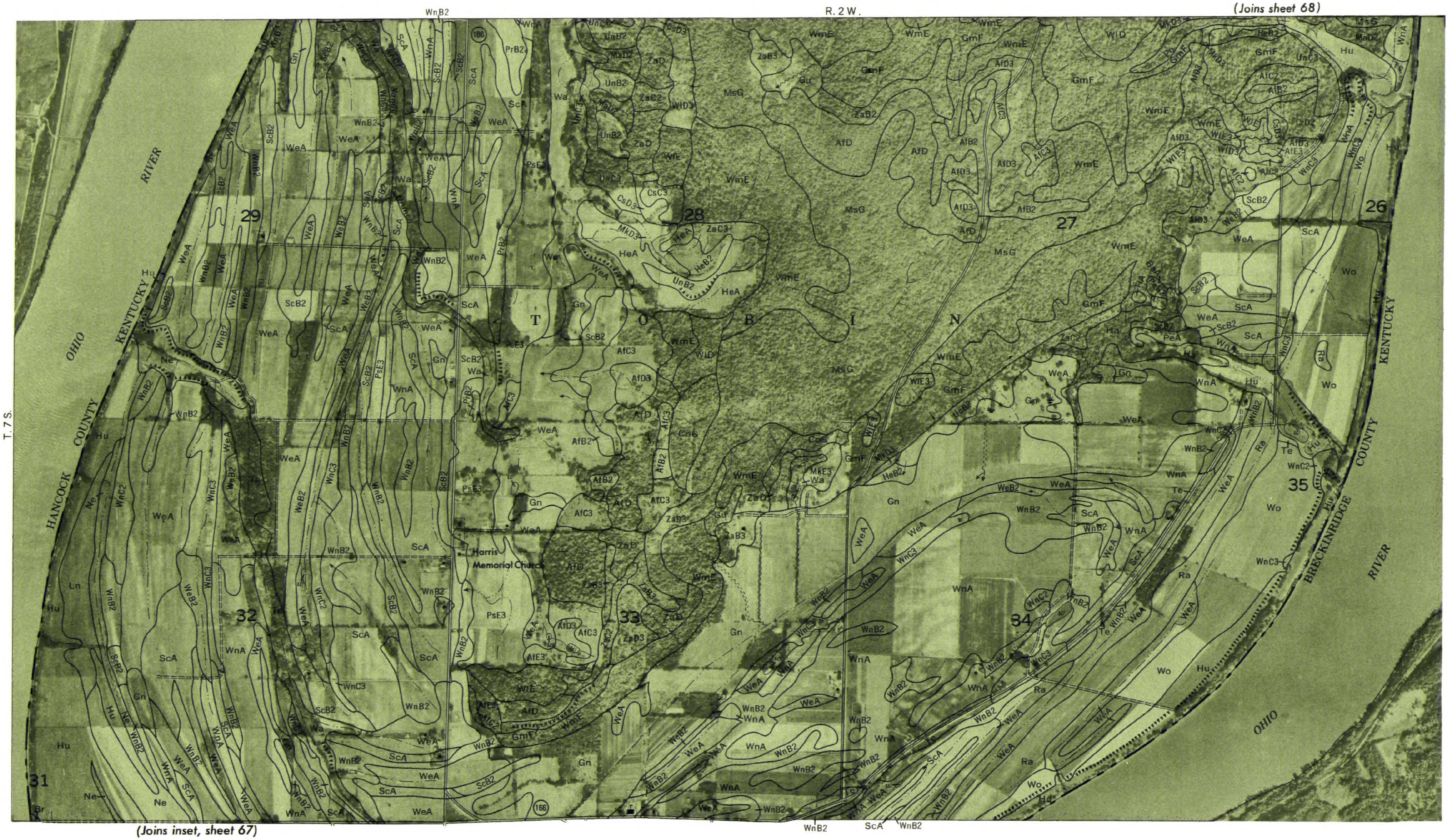
Land division corners are approximately positioned on this map.

PERRY COUNTY, INDIANA NO. 69



0 ½ Mile
Scale 1:15 840
0 3 000 Feet